Crime Scene & Evidence Photography

Milwaukee Area Technical College

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PowerPoint is available on-line

- ecampus.matc.edu/policetraining
- Required Equipment: Students need to bring their digital camera (digital SLR preferred), lens, batteries, digital media, off camera flash with remote cord, tripod (if available), flashlight and note taking materials.
- Instruction manuals for their specific camera and flash are suggested if available.

Introductions

- Name /Title/Years of Service
- Department / Dept Size
- Experience with Photography
- What are your Responsibilities with Evidence and Crime Scene photography
- What do you want out of this class

International Association for Identification (IAI) Membership

theiai.org

The oldest and largest forensic association in the world. This professional forensic association represents a diverse, knowledgeable and experienced membership that are assembled to educate, share, critique and publish methods, techniques and research in the physical forensic science disciplines

International Association for Identification (IAI) Membership

- Annual International Educational Conference and additional educational seminars offered throughout the year
- The Journal of Forensic Identification (JFI), a bimonthly scientific journal with articles in all branches of forensic identification, plus Identification News, a bimonthly newsletter
- Personal contact with identification specialists through conferences, workshops, and seminars.
- Information on the latest decisions and other late-breaking items posted regularly to the IAI's web site.
- Employment announcements.
- An annually updated Membership Directory

IAI Benefits continued

- Certification in various areas of forensics
  - Certified Crime Scene Investigator
  - Certified Crime Scene Analyst
  - Certified Senior Crime Scene Analyst
  - Certified Crime Scene Reconstructionist
  - Bloodstain Pattern Analyst
  - Footwear
  - Forensic Art
  - Forensic Photography
  - Forensic Video
  - Latent Print
  - Tenprint

Free Subscriptions

- Evidence Technology Magazine
  - Available to qualified professionals in either print or digital editions
  - EvidenceMagazine.com
- Forensic Magazine
  - Forensicmag.com

Guidelines & Best Practices

- For Guidelines and Best Practices utilize the website for The International Association for Identification (**theiai.org**)
  - SWGIT (Scientific Working Group on Imaging Technology) has been discontinued due to lack of funding but it's guidelines are still available as a valuable resource (**www.swgit.org**)
- Some of the information available
  - Equipment
  - Image capture, processing, archiving & authentication
  - Photography of latent, tire and footwear impressions

Introduction

- Crime scene photography tells a story to those who were not present at the scene.
- Provides visual preservation of the scene, location and condition of evidence, and creates a permanent record
- Ensures accurate representation of the evidence for a thorough investigation and successful prosecution of the case.
- Aids in the reconstruction of events
- Refreshes the memory of investigators and witnesses

Introduction

- Remember, prosecutors, judges, juror's, witnesses and victim's families may view the photographs you take. Your work product is a reflection upon you.
- Photos **should be fair and accurate** when showing what the scene looked like to you or a witness.

Why do you need to spend so much time learning photography?

- Not every scene will require you to:
  - Dust for prints
  - Collect blood or DNA
  - Cast shoe or tire impressions
  - Collect other trace evidence

However, all scenes require **quality photographs** before any processing occurs!!!!!

Can't I just use the camera's automatic setting?

- Quality modern camera equipment will produce very good photos most of the time. However, you can take better photos yourself if you understand basic principles and make manual adjustments.
- The camera doesn't know what your goal is and can produce a photo that is too light, too dark or out of focus.

Camera was on automatic – image too dark

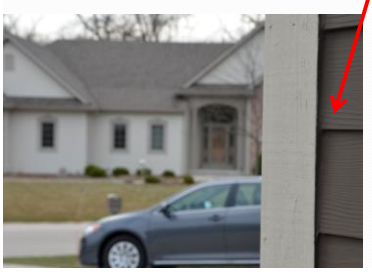
Camera on "automatic" may not expose properly creating either a too dark, or too light image

By using the camera's meter, you can decide the proper exposure and adjust for it

What creates this shadow?

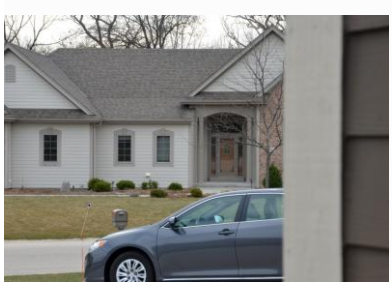
Has this happened to you?

The objects of interest are the car and house but are blurry due to the **auto-focus** setting in the camera. The focus sensor locked in on the closest object instead.



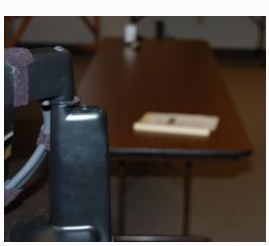
There are times when you need to show a scene or witness point of view with an obstruction, but the obstruction should not be the sharp portion of the image.

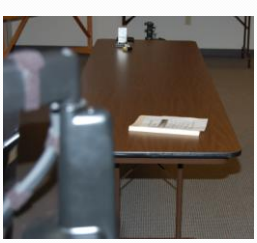
This was corrected by simply moving slightly to the left, pressing the shutter release halfway to lock the focus on the objects of interest, re-composing and pressing the shutter all the way capturing the image



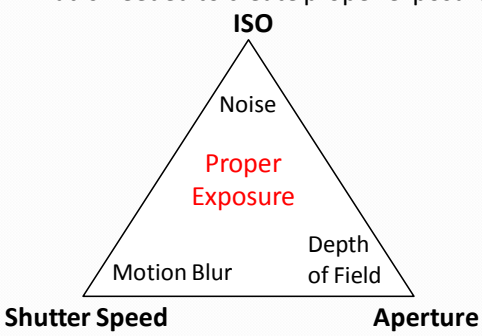
Notice how the wall is still shown but becomes blurred, and the car and house are much sharper

It can be even more critical with close objects and auto-focus





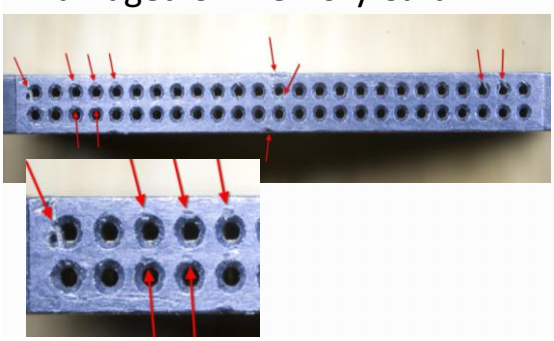
What is needed to create proper exposure?



Memory Card Slot

- Memory card slot cover
  - Located on the side of the camera, allows you to place digital media into camera.
  - Keep closed to prevent dirt and moisture out.
  - Use caution when inserting your digital media into the slot to prevent damage to the metal contacts that are inside, and always have camera turned off.

Damaged CF Memory Card



Memory card slot

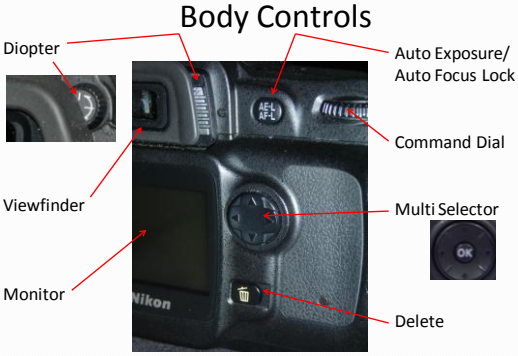
- Most cameras have 1 slot
- If a camera has 2 slots:
- Slot 1 is the main card
- Slot 2 can be:
  - Overflow
  - Backup
- Slot 1 RAW and Slot 2 JPEG combination
- Programmed in shooting menu

Body Controls

Shutter Release Button
- Activates shutter capturing the image

- <u>Also activates</u> internal light and focus meters

Body Controls



Body Controls

Single or Continuous Shooting Mode

Menu

Playback

ISO/Thumbnail

White Balance/ Help/Protect

Image Quality

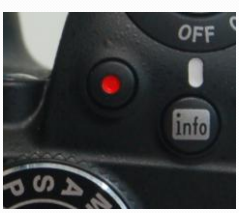
Live View Activation

On top of body

On rear of body

"info" button

The "Info" button activates the display on the monitor and is located on the top or rear of body



"i" button

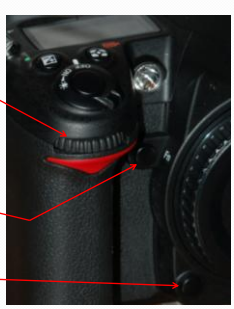
Press the "i" once to view settings on the monitor, a second time to make a change. Highlight the item using the multi selector then press "OK" to select options.

Body Controls

Sub-Command dial

FN – assignable function button

Depth-of-field preview button



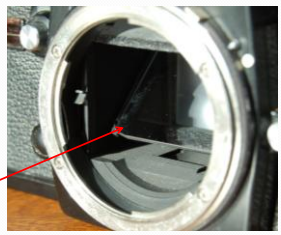
Body Controls

- Lens Release Button
- Focus
  - Auto
  - Manual

Body Controls

- Hot Shoe / PC Socket
  - Hot shoe is on top of camera
  - PC socket is usually on the side or front of camera body
- Self Timer

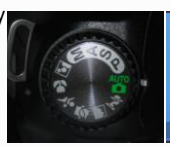
Body Functions



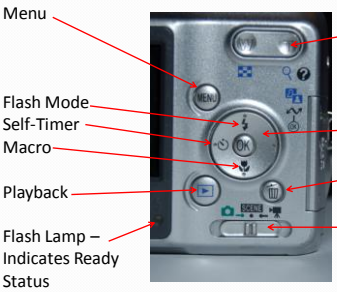
- Mirror
  - Directly behind the end of the lens that attaches to the camera body. Covers the shutter or sensor and allows camera user to see through the eye piece and look directly through the lens for a "what you see is what you get."

Body Controls

- Camera modes
- Different cameras have different modes available
  - Scenes (could be programs for action or portraits indicated by icons of a runner or woman's face)
  - Shutter Priority
  - Aperture Priority
  - Manual
  - Automatic
  - Program



Body Controls

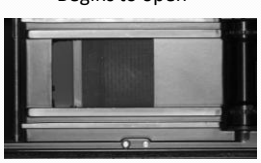


Body Controls

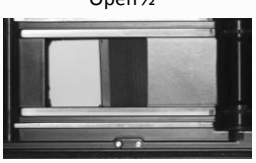
- Shutter
  - Traditional type was a curtain made of cloth. Modern cameras use blades made of aluminum alloy, carbon fiber or titanium that blocks the light that comes through the lens. The shutter opens and closes at a preset amount of time called shutter speed. Usually found at the back of the camera, just in front of the film.
  - With digital, you may have an electronically controlled shutter or a combination of mechanical shutter and electronic sensor that turns on for a specific amount of time.

Shutter

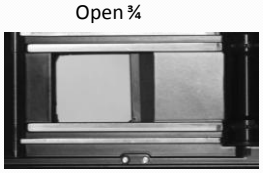
Begins to open



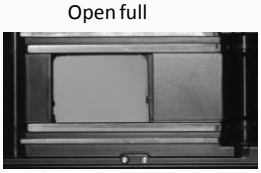
Open ½



Open ¾



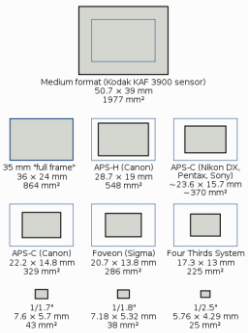
Open full



Body - Image Sensor Size

Film has been replaced by a microchip with microscopic transistors. Millions of transistors create the chip that is the image sensor. The larger the sensor, the better the quality.

As the sensor is made smaller, a multiplier is used to replicate a normal (cropped) view or normal perspective. APS-C is multiplied by approx 1.5x.



50mm lens with Full Frame camera

In order to replicate a "normal" view or perspective, a "full frame" camera would use a 50mm lens as shown above

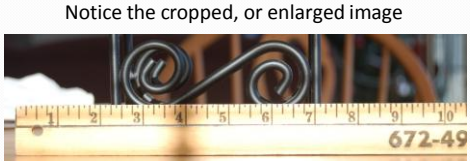
With a digital camera that has a smaller sensor, you would use about a 35mm lens as shown below. 35mm x 1.5 = 52.5 (close to 50mm)

35mm lens with APS-C smaller sensor

If you don't compensate for the smaller sensor, you will have a cropped effect

50mm lens with Full Frame camera

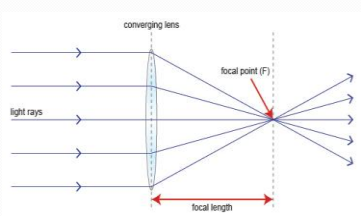
50mm lens with smaller sensor.
Notice the cropped, or enlarged image



Lenses

Lens Functions & Focal Length

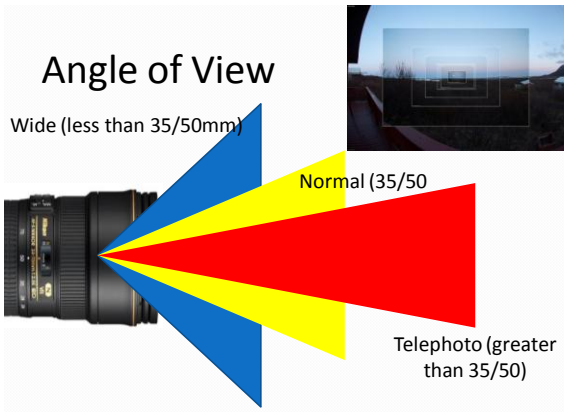
- Lens
  - Serves to focus light rays / image so it is crisp and clear on the sensor.
- Focal Length measured in millimeters



Focal Length

- Focal Length measured in millimeters (affected by the size of the camera's sensor)
- The smaller the sensor, the more magnification (crop)
  - Wide angle Digital APS-C less than 35mm
  - **Normal** Digital APS-C @ **35mm** (Full frame DSLR, then 50mm)
  - Telephoto Digital APS-C greater than 35mm
  - Zoom – multiple focal lengths incorporated into same lens 28-200mm
  - With most "point and shoot" cameras it's not easy to figure out what focal length the lens is set at

Angle of View



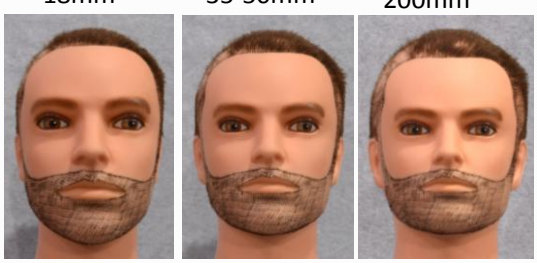
Lens Functions

Focal length can distort normal perspective

24 mm lens | 50 mm lens | 200 mm lens

Lens Distortion

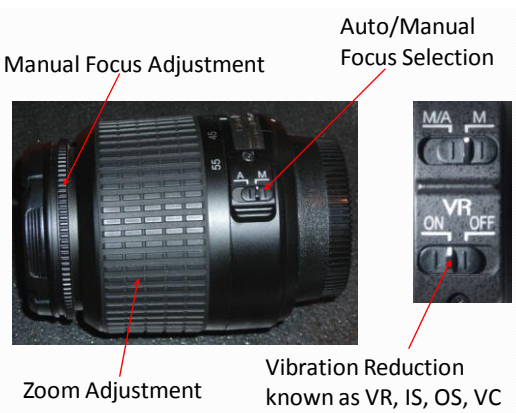
18mm | 35-50mm | 200mm



Lens Functions

- F/stop or Aperture
  - An opening (hole) that controls the amount of light that is allowed to strike the sensor or film
  - Expressed in whole and decimal numbers – f/16 or f/2.8
  - May be controlled on the lens or electronically by the camera
  - Also controls Depth of Field or "That which is in apparent focus"
  - Stopping up or down means changing the f/stop

Lens Designations & Controls



Vibration Reduction Designations

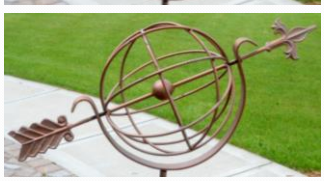
- Vibration Reduction (VR) - Nikon
- Image Stabilizer (IS) – Canon
- Vibration Compensation (VC) – Tamron
- Shake Reduction (SR) - Pentax
- Anti-Shake (AS) – Minolta
- IBIS - In Body Image Stabilization – Olympus
- Optical Steady Shot (OSS) - Sony

Vibration Reduction

Hand held
1/8 Second
F-36
ISO 200

VR Off

VR On



Auto Focus vs. Manual Focus

- Auto focus works well and quickly in bright areas
- In limited lighting, the camera may not let you take the photo if the camera can't focus
- Manual focus will generally be best for close up work and especially where limited light is available
- Manual also works well for moving objects if you can pre-focus on an area then take the photo as the person or object moves into the area, such as surveillance and sporting events

Common types of flash memory cards for digital cameras:

Compact Flash

Secure Digital (SD)

Size of memory

xD-Picture Card

Memory Stick

How many photos can a card hold?

Memory cards come in different storage capacities, ranging from 8MB all the way up to 64GB and beyond.

•How many digital photos the card can store depends on the resolution (megapixels) of your camera, the quality of image, and file size you choose.
•The higher the resolution or megapixels, the larger the file size and the more memory each photo uses.
• Many SOP's recommend using the highest quality images for crime scene and evidence such as RAW
•Some labs require RAW files for comparison work
•Otherwise use higher quality JPEG images

Photo Resolution	Memory Card Photo Capacity*				
	256MB	512MB	1GB	2GB	4GB
3 Megapixels	219	438	876	1752	3504
4 Megapixels	134	268	538	1077	2152
5 Megapixels	100	200	403	807	1612
6 Megapixels	84	168	336	673	1344
7 Megapixels	38	77	154	307	614
8 Megapixels	20	40	80	161	323

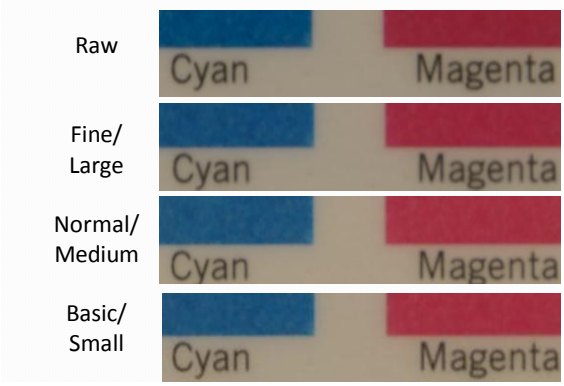
*Average file size using "high-resolution" JPEG mode

In addition to resolution, the capacity also depends on the **combination** of image quality **and** image size

Using a 1 GB card in a 6.1 megapixel Nikon D50 camera, the following chart indicates the photo capacity

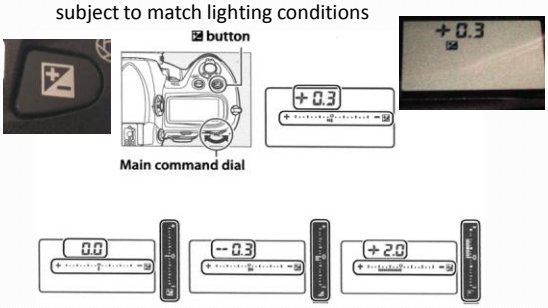
Printed image size:	Large 15"x10"	Medium 11.5"x7.5"	Small 7.5"x5"
• RAW	135	N/A	N/A
• JPEG Fine	285	495	1000
• JPEG Norm	552	940	1800
• JPEG Basic	1000	1700	3100
• RAW + Basic	119	N/A	N/A

The **combination** of image quality **and** image size can be selected in the menu or external buttons

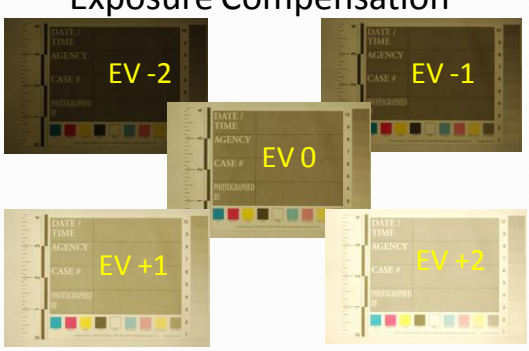


Exposure compensation

- Causes camera to under or over expose your subject to match lighting conditions



Exposure Compensation



Exposure Compensation Exercise

Please turn your exposure compensation back to the zero setting for future exercises

Shutter Speed

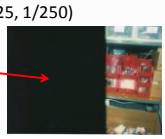
- The AMOUNT of TIME the shutter is open or the digital sensor is on, allowing light to strike the sensor
- Combined with aperture & ISO for proper exposure
- Generally measured in fractions of a second
  - 1/60th (indicated by the number **60**, or 1/60)
  - 1/125th (indicated by the number **125**, or 1/125)
- May be seconds or even several minutes long
  - 1 second (usually indicated by **1"** or different color)
  - 30 seconds (usually indicated by **30"**)
  - "Bulb" is used for time longer than 30 seconds

Shutter Speed

- Controls Motion
  - Fast shutter speeds "freeze" motion
    - Race car "stopped" on the track
    - Sporting events
  - Slow shutter speeds can "blur" motion due to:
    - Camera movement
    - Object/person moving

Shutter Speed

- On bright sunny days, you have the chance to over-expose your photos, or wash them out
- In order to reduce the amount of light getting to the digital sensor, use a faster shutter speed
- Change from 1/60 or 1/125 of a second, to a faster speed of 1/500 or even 1/1000th of a second
- Flash Synchronization Speed
  - Generally about 1/60th Second
  - May be higher depending on camera (1/125, 1/250)
  - Too fast of a shutter speed can cause part of the photograph to be cut off



Shutter Speed

- May be set by a dial or combination of buttons and/or dials
  - 60 actually means 1/60th of a second
  - Shutter speeds will be displayed in the control panel, viewfinder, on the monitor or a combination of these

Slower shutter speed allows more light (exposure)

Shutter Speed – 1/60
Camera held still, But too slow for vehicle

Shutter Speed – 1/250 and camera panned with vehicle

Shutter Speed – 1/1000 Camera hand held

Standard Full Shutter Speed Stops

- 1/2000
- 1/1000
- 1/500
- 1/250
- 1/125
- 1/60
- 1/30
- 1/15
- 1/8
- 1/4
- 1/2

Tripod suggested below this speed

" indicates full seconds

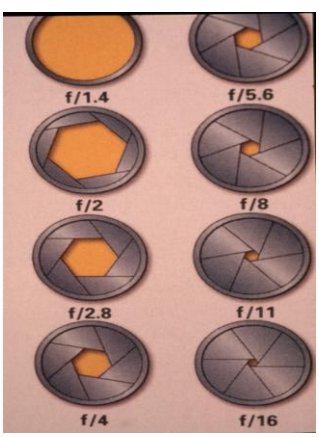
- 1"
- 2"
- 4"
- 8"
- Speeds continue up to 15-30"
- Bulb after 30"

Some speeds can get confusing between 1/8 second and 2 seconds

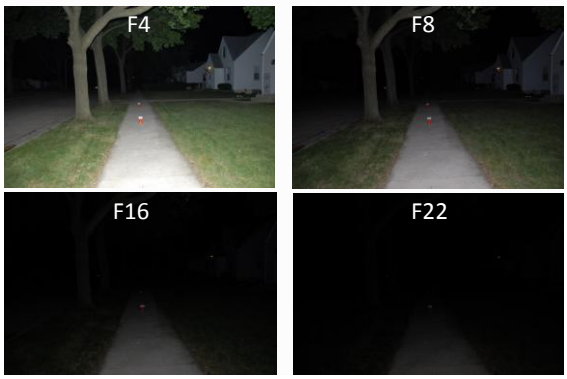
Shutter Speed shown on camera				
8	=	1/8	=	.125 Seconds
6	=	1/6	=	.166 Seconds
5	=	1/5	=	.20 Seconds
4	=	1/4	=	.25 Seconds
3	=	1/3	=	.33 Seconds
2.5	=	1/2.5	=	.4 Seconds
2	=	1/2	=	.5 Seconds
1.6	=	1/1.6	=	.625 Seconds
1.3	=	1/1.3	=	.77 Seconds
1"	=	1"	=	1.0 Seconds
1.3"	=	1.3"	=	1.33 Seconds
1.6"	=	1.6"	=	1.6 Seconds
2"	=	2"	=	2.0 Seconds

Aperture

- F/stops
  - A specific sized hole that is controlled w/in the camera lens
  - Allows a specific amount of light through the lens to the sensor
  - The larger the opening, the more light gets in
  - Controls Depth of field



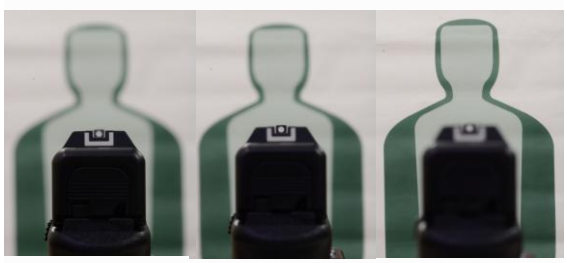
Larger opening (lower number) allows more light



Depth of Field

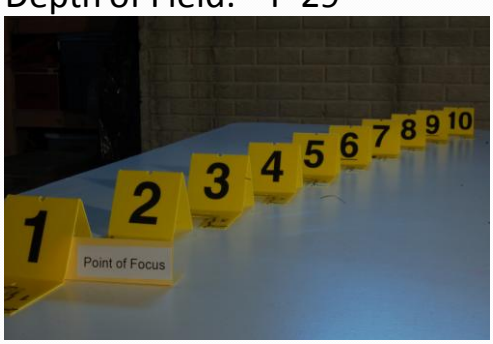
- The area of the photograph before and after the point of focus that is clear and sharp
- Controlled by the aperture
- The larger the opening, the less depth of field
- The smaller the opening, the greater depth of field
- It becomes more critical on close up photography such as fingerprints on a curved surface such as a light bulb or door knob
- Smaller sensors (compact cameras) have more depth of field at the same F-Stop. F2.8 could be equal to F8 on a DSLR

Depth of Field



Depth of Field: F-4.8

Depth of Field: F-29

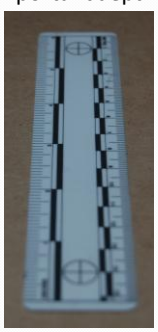


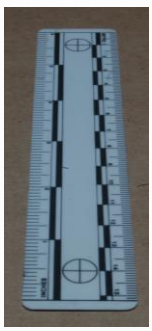
Depth of Field

- The point of focus can also affect the depth of field
- Balance depth by using the "rule of thirds" which means to focus one third of the way through the scene

The closer to the object, the more important depth of field becomes

F-5.6





F-36

Close up of fingerprint on light bulb

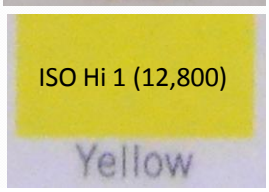
Film/Digital Sensitivity

ISO – Film speed or the digital equivalent

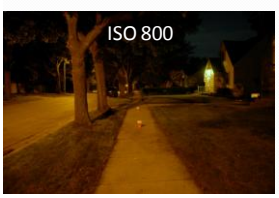
- Film speed/ISO is the sensitivity to light
- The lower the ISO number, the less sensitive to light
- The higher the ISO number, the more sensitive to light
- 100 speed film is less sensitive to light and needs MORE light to be properly exposed than does 200 speed film

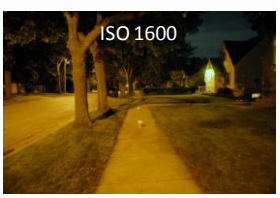
•The more sensitive to light , the more grainy it gets, generally lowering quality

•ISO 100 produces better quality than ISO 1600



1 Second Shutter – No Flash

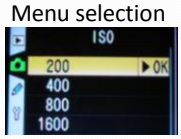


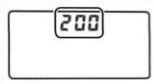


Changing ISO settings

External buttons

Menu selection





Top control panel

Rear control panel

Viewfinder

What is the Sum of the Equation?

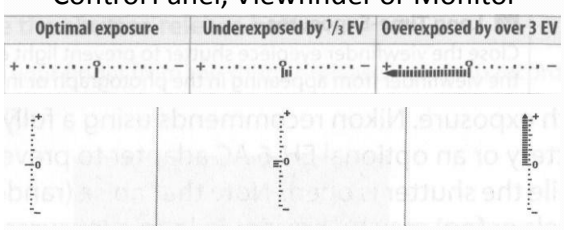
Exposure!

- Exposure is the combination of shutter speed, ISO and aperture (F-Stop) to allow the proper amount of light to strike the sensor. This is needed to properly record what you see for later reproduction

Exposure

- Light Meter – internal to the camera
  - Measures the amount of light reflected from the scene or objects
  - Helps set the proper shutter speed and / or aperture
- Determined by Through The Lens metering or "TTL"
- In camera (TTL) metering is accomplished by using the meter you see inside the camera's view finder (or on the monitor) to adjust exposure
  - May be a series of vertical or horizontal lines with a + or – at opposite ends.
  - May be a series of numbers such .3, .7, 1.0, 1.3 etc. with a + or - on the side or bottom of the view finder.

Control Panel, Viewfinder or Monitor



0.0 -.3 +3.0

Metering

- Cameras have various metering modes (the area that the light meter analyzes/reads)
- Overall or Matrix
  - Meters 90-100% of the scene
- Center weighted
  - Meters about 10-30% of the center of the frame
- Spot
  - Meters about 1-9% of the frame
- **Metering is used for ambient lighting conditions, <u>not when using flash</u>**

Canon Metering Modes

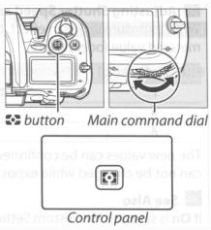
Evaluative: All around averaging

Partial: Good for backlighting

Spot: Specific small area

Center-weighted: Metered at center then averaged

Metering can be adjusted with an external button or in the menu

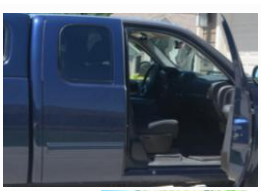


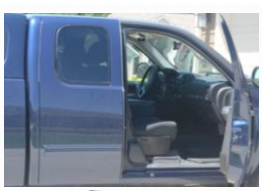
Nikon

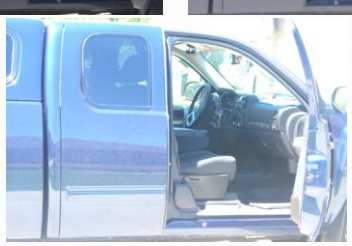
Canon

1 **Select [Metering mode].**
- Under the [📷] tab, select [**Metering mode**], then press <SET>.

2 **Set the metering mode.**
- Press the <◀▶> key to select the metering mode, then press <SET>.







Where's the gun?

There it is!

Backlighting from sun

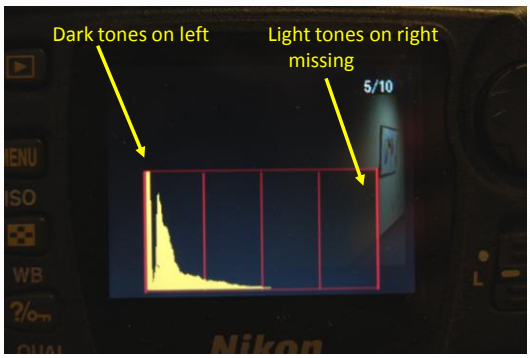
Camera used with automatic or program setting is fooled by the bright sky in the background and created a dark object


Program/ Automatic

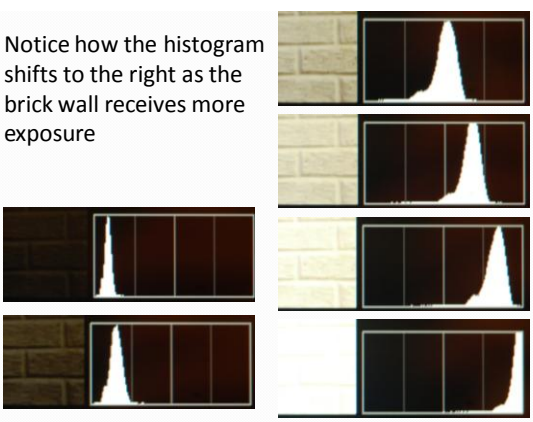

Manual & metered


Program & fill flash

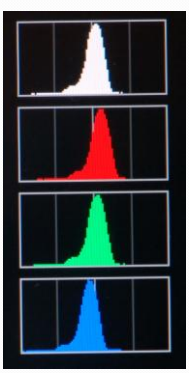
Some cameras have "**histograms**" viewed on the rear monitor



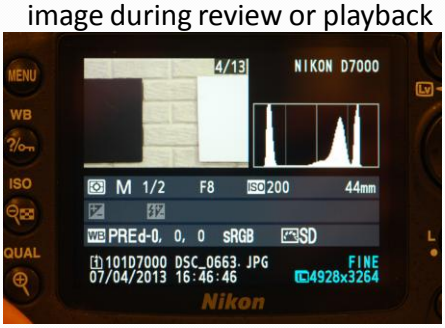
Notice how the histogram shifts to the right as the brick wall receives more exposure



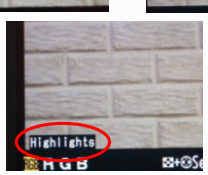
Some cameras will have only a brightness histogram shown in white. Others will have a histogram for each of the red, green and blue color channels



Information available about the captured image during review or playback



Metadata or shooting data and "Highlights"



White Balance

Computer generated settings to compensate for lighting conditions

- Incandescent (approx. 2700 Kelvin)
- Fluorescent (approx. 4000 Kelvin)
- Sunlight – noon (approx. 5400 Kelvin)
- Cloudy or Shade (6500-8000 Kelvin)
- Flash
- Custom (preset)

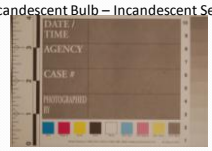
Light Temperature

- Different sources of light have different light temperature
- Measured in degrees Kelvin
- Warmer temperatures are orange
- Cooler are blue

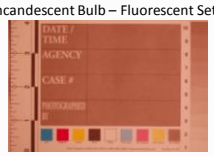
White Balance

Incandescent Bulb – Auto Setting

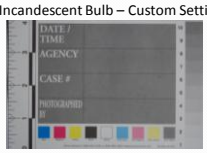
Incandescent Bulb – Incandescent Setting



Incandescent Bulb – Fluorescent Setting



Incandescent Bulb – Custom Setting



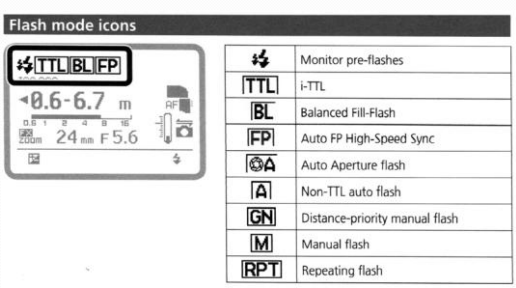
White Balance

Flash

Flash

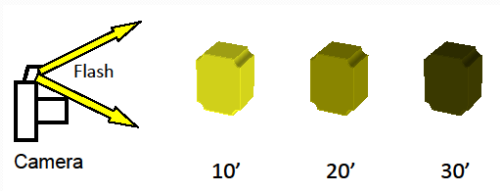
- **Dedicated**
  - Is camera brand, make, model specific
    - Provides "automatic" exposure functions by **communicating with the camera** to find distance from subject and calculate amount of light for proper exposure.
    - Can need specific equipment such as flash synchronization cord
    - Generally more versatile but can be more expensive
- **Non-Dedicated**
  - Is brand generic and usually less expensive
    - Works with most camera's
    - May have to adjust settings manually

Nikon SB-900
Some flashes can be complex



Flash

- The further an object is from the flash, the less light the object will receive to be properly exposed
- Light intensity drops off very quickly



Flash Technique

The angle of incidence is equal to the angle of reflection. If slightly angled, there is little or no glare or wash out reflection in the photograph. Bounce flash can also be used.

Direct - can result in wash out

Best if flash is off camera

Flash Technique

- Bounce
  - May bounce off of ceiling, wall, floor, any object
- Must allow for one stop correction
  - Light fall off occurs due to the distance that the light has to travel. You will probably have to adjust by an F-Stop and or increase the power of the flash
- Can reduce glare from glasses and "red-eye"

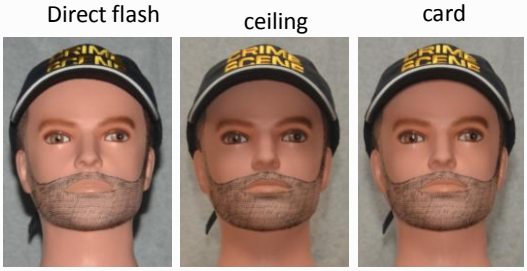
Bounce Technique

Bounce Technique

Direct flash

Bounce flash – ceiling

Bounce flash with reflector card

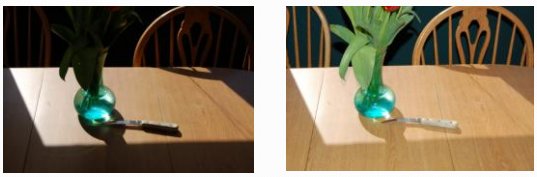


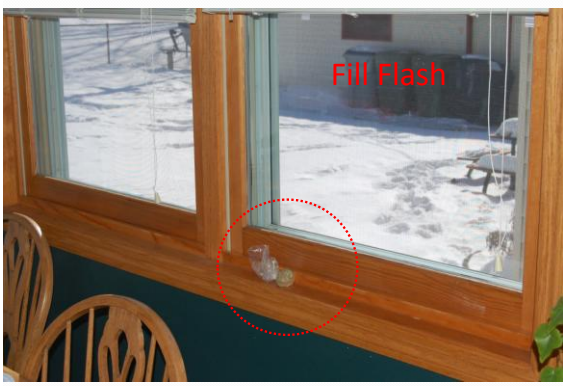
Flash Technique

- Diffused
  - A translucent filter is placed over the flash to diffuse or break up the light and give it a softer look

Flash Technique

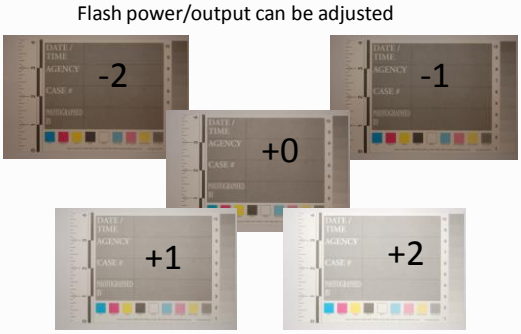
- Fill Flash
  - Used to add light to shadows





Flash Compensation

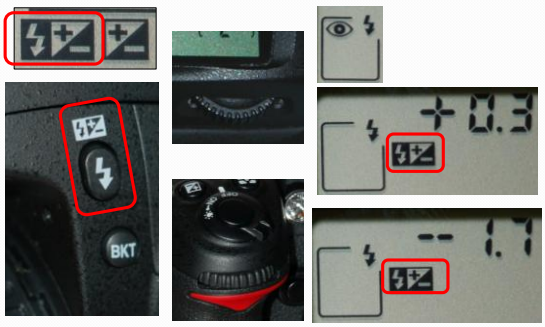
Flash power/output can be adjusted



Adjusting Output - Built-In Flash

Can be done in the menu on many cameras

Adjusting Output - Built-In Flash



Adjusting Flash Power Levels

Adjusting Standard TTL exposure usually by 1/3 stops

Adjusting Manual mode exposure

Adjusting Flash Power Levels

Nikon SB-900 TTL

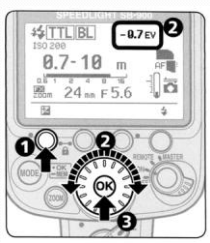
1) Press the Function button to highlight the Flash Output level

2) Rotate the sector dial by 1/3 steps up to +3.0 or down to -3.0

3) Press the "OK" button to set

4) To cancel, turn the selector back to "0". It will not return just by turning it off.

Adjusting Standard TTL exposure usually by 1/3 stops



Flash Power

Pop Up Flash +1

Nikon SB-600 Full

Flash Technique – Impression Evidence

- Use flash at different angles/heights
  - 3 Dimensional footwear and tire impressions generally require from 0 to 45 degrees of angle
  - The deeper the impression, the higher the angle
  - Take multiple photos with low, medium and high flash positions from all four sides
  - Can be used for tool impressions, latent prints, bite marks and injuries

3 Dimensional Footwear

Flash directly above impression

3 Dimensional Footwear

Flash from bottom

3 Dimensional Footwear

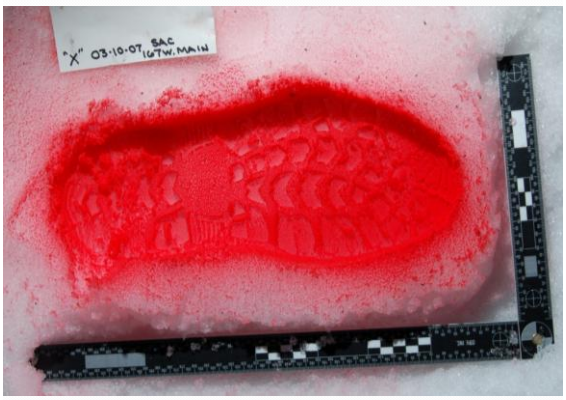
Flash from top

If you want better detail, get closer - Heal section

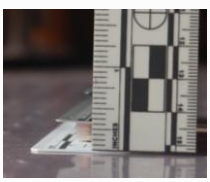
If you want better detail, get closer - Front section

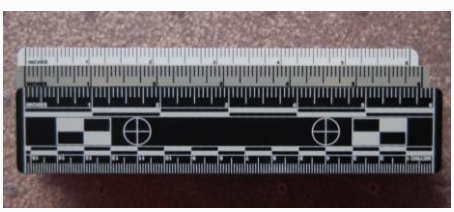
Camera set up

How to create shade



Scale must be at the correct depth

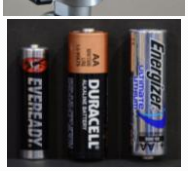


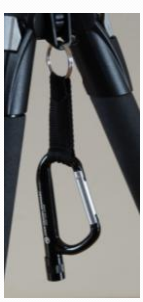


Camera set up

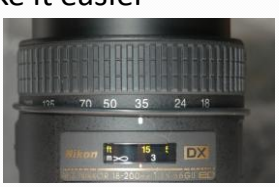
- Camera back parallel to the impression tread
- Fill the frame with impression and scale
- Scale placed at same depth as tread
- Add label/document impression information
- Use highest quality settings such as RAW
- Use a normal lens such as 35mm or 50mm
- Use flash from all four sides and three different heights: low, medium and high

Some equipment that can make it easier





Some equipment that can make it easier

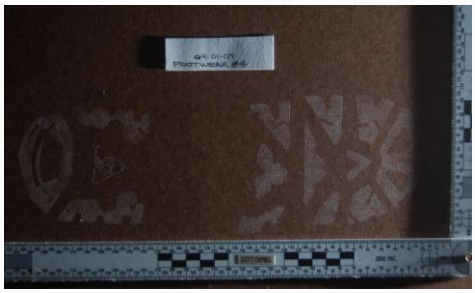


2 Dimensional Footwear

Flash directly above impression

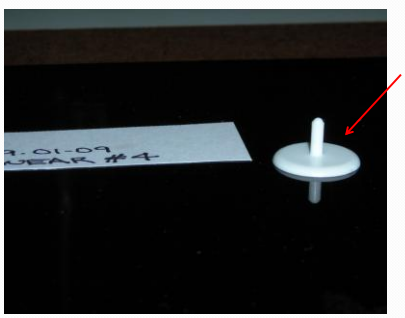
2 Dimensional Footwear

Flash at very low angle from right



2 Dimensional Footwear - EDL

2 Dimensional Footwear

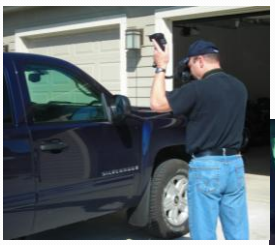


2 Dimensional Footwear

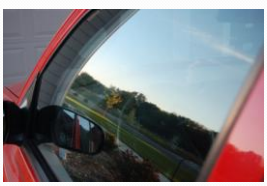
Notice
shadow
From
marker

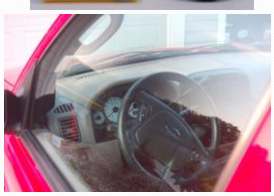
Photos through glass

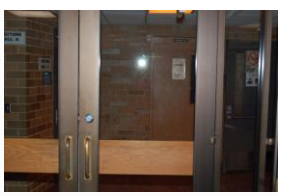
Position camera and flash on glass



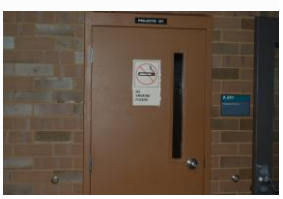
Use of a polarizer filter







Bottom photos are better with no glare from flash



Vin Number - Daylight

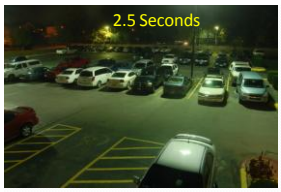
Glare from sun

Glare from sun blocked with hand or clipboard

Time Exposure

- Equipment needed
  - Camera
  - Tripod
  - Shutter release cable (optional) or remote

- Procedure
  - Focus 1/3 of the way through the scene
  - Take a metered reading and take a photograph
  - Next, experiment with varying time lengths.
    - Double your exposure each time
    - Time will vary depending on lighting



All photos shot at ISO 200/F-5.6/18mm lens.

Scene using flash

What time of day is it?
Look at the shadows

Time Photography

F4.8/120 sec/ISO 1600

Time Exposure

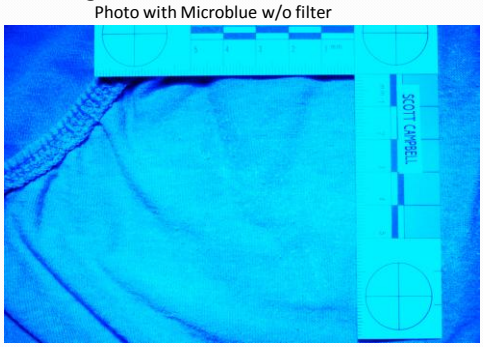
- Fluorescent photography
  - Same basic equipment and procedure
    - Times will vary
    - Use small f/stops for curved surfaces
      - I.e.: f/11 or f/16
  - Use a scale that does not wash out, but shows in the photograph

Forensic light source

Normal flash photography

Forensic light source

Photo with Microblue w/o filter



Forensic light source

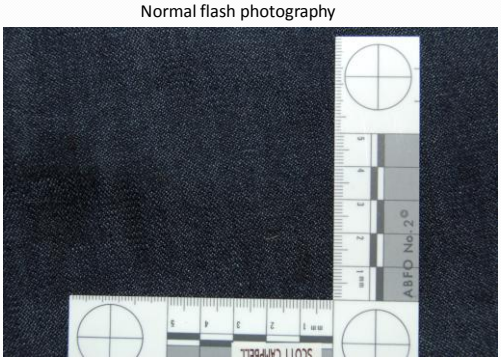
Photo with Microblue w/ filter

Exposure:

20 sec. @ F-11

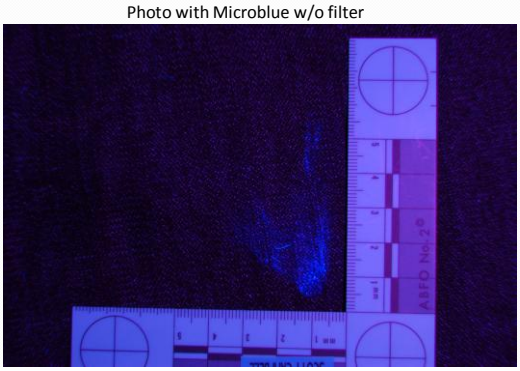
Forensic light source

Normal flash photography



Forensic light source

Photo with Microblue w/o filter

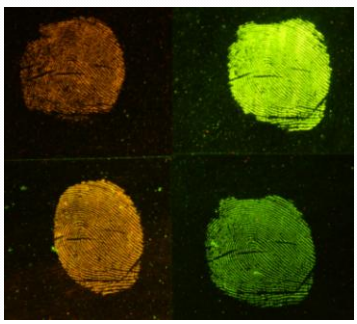


Forensic light source

Urine with Microblue Exposure: 13 sec @ F-7.1

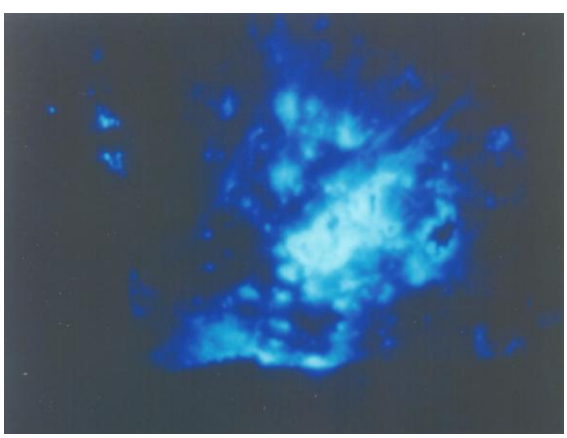
RSAI

Fluorescent powder can be difficult to see under normal lighting – F5.6/ISO 200/5 seconds



Time Exposure

- Luminol
  - Same basic Time Exposure set up
  - Exposures greatly vary depending on strength of "glow" from the suspected blood and how much you can cause it to fluoresce without diluting the sample
  - Photograph in "normal" light with and without a scale
  - Use caution and protective gear when using any luminol type chemicals
  - Use larger (more open) f/stops to gather more light
  - You may need to increase the ISO setting



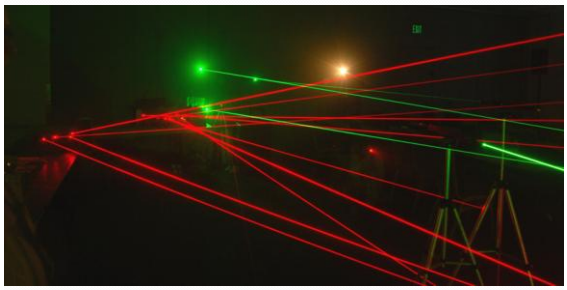
Time Exposure

TV screens, monitors or even cell phones.

1/80th second

1/20th second

Time Exposure can be used for lasers and bullet path



Painting with Light

- Procedure
  - Focus 1/3 of the way through scene
  - Set flash at highest power setting
  - Use a partner if possible
  - Set camera to "bulb" setting to lock shutter open
  - The person with the flash signals the camera operator to lock open the shutter.
  - The flash operator then holds the flash away from their body and at a slight angle away from the camera and into the scene.
  - The flash is then manually discharged about every fifteen to twenty feet for the length of the scene.
  - DO NOT flash back at the camera
  - The same procedure is then performed, only the flash operator comes back toward the camera on the opposite side of the scene

Single flash used with ISO 400, F-5.6, 1/60 second

ISO 400, F-8, 80 seconds – painted with multiple flashes

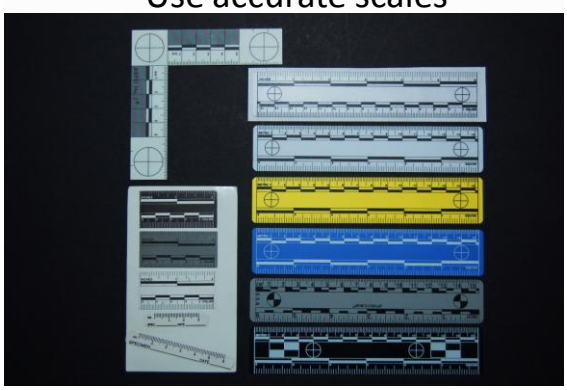
Painting with Light

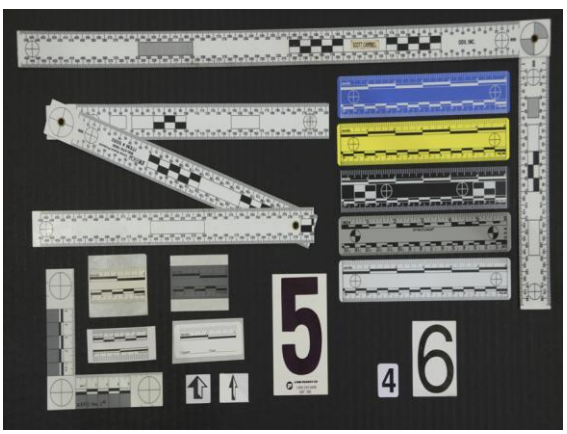
ISO 400, F-8, 30 seconds – painted with multiple flashes

Scales

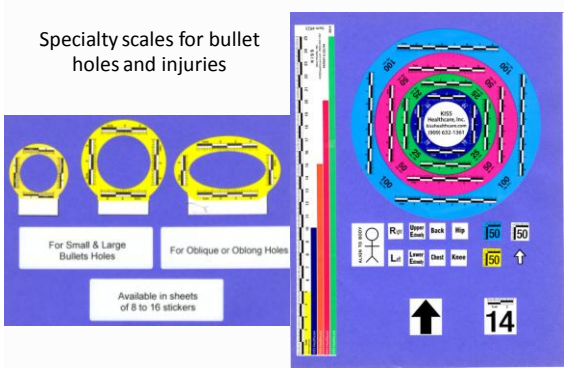
- Proper scales MUST be used for comparisons by the crime lab
  - Used for fingerprints
  - Tool marks
  - Foot and tire impressions
  - Bite marks
  - Blood spatter

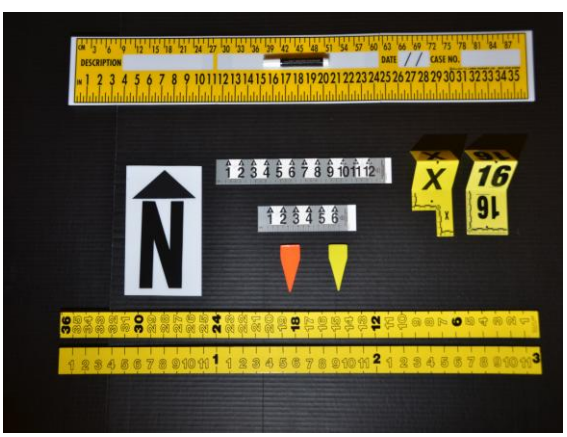
Use accurate scales





Specialty scales for bullet holes and injuries

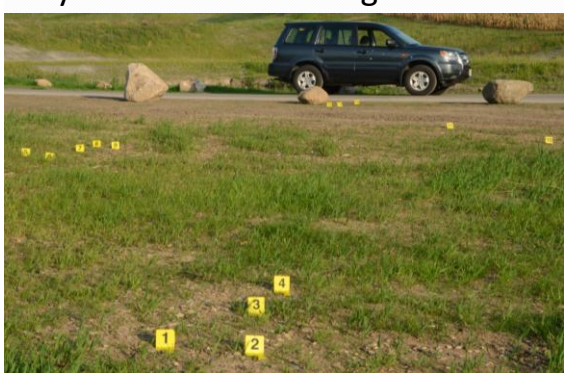




Placards/Evidence Markers

- Numbered or lettered scene markers
  - Used to show items of evidence in the scene
  - May be "tent markers"
  - Cones
  - Paper cups if necessary
  - All placards should face the same direction in order to be viewed from the same direction

Lay out markers in a logical order



Fields of View/Scene Photos Use the "Rule of Three"

- **Overall Photos (orientation)** – establishes location
- **Medium Photos (relationship)** – relationship of evidence to location and other evidence
- **Close Up Photos (identification)** – of evidence

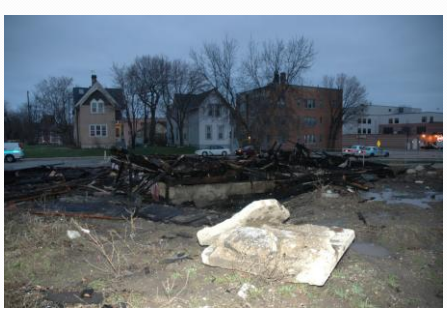
  <u>Additional when needed:</u>
- Macro Photo – examination quality

Fields of View/Scene Shots

Overall Photograph

- Shows a general overall view of the scene from the investigator's view starting in proper event sequence
  - May be used to show a witness viewpoint and confirm or deny their "eye witness account."
- Take overall photos without evidence markers, then add them and take overalls again
- Wide angle lens can be used if needed
- Overlap photos of walls, ceilings and floors to "stitch" or connect them together later

Including a landmark in the background can be helpful for orientation



Or include an address or business name

Overall Outdoor Scene

Medium Photograph

- Shows more detail of the scene and items within the scene
- Over-lapping of photos needed to show relationship of different pieces of evidence and their locations
- With and w/o scene marker if appropriate

Medium photos can also be overlapped as shown in the following photos

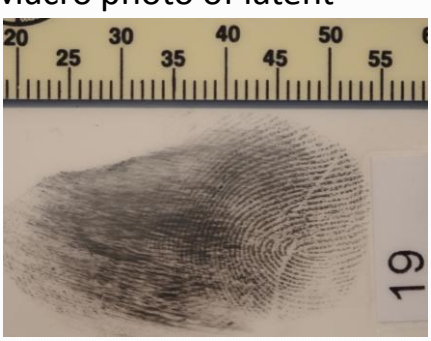
Close up Photograph

- Shows great detail of specific items, but not able to place item in the scene by the photograph alone
- Most likely with scene placard / marker
- Shows object of interest in great detail
- Accurate scale required for comparison work
  - Latent, footwear and tire impressions
  - Tool and bite mark impressions
  - Blood pattern evidence
  - Any small evidence to indicate actual size

Close up - Macro

- Shows very fine details of wounds, tools, tool marks, impressions, fingerprints, bite marks
- Scale required for comparison work by a lab
- Film plane should be parallel to object being photographed
  - Effective use of flash techniques are very important for macro work
  - Camera should be steady, a tripod helps
- Depth of field is very shallow
  - Must correct for this by using a smaller f/stop
    - f/11, f/16, f/22

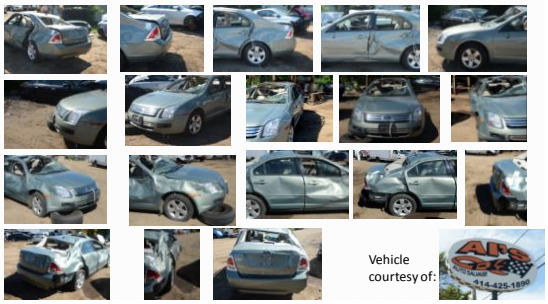
Macro photo of latent



Latent on knife blade

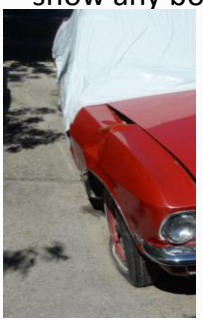
Serious Accident Photos

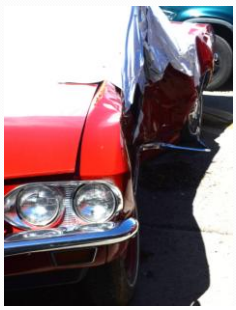
Take photos down all sides of vehicles and at each corner. Use a 35mm lens for APS-C digital sensor or 50mm for full size to replicate what the eye would see



Vehicle courtesy of:

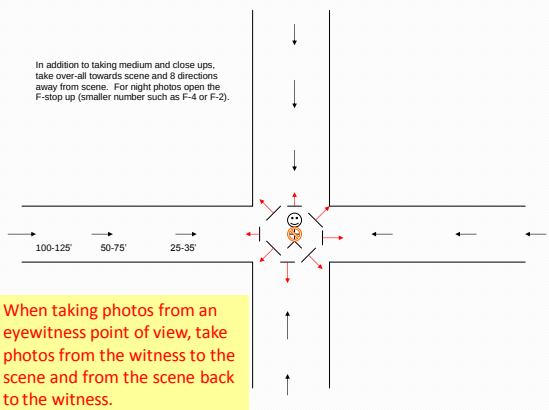
The photos down the sides should show any body/frame distortion





Mark tire and photograph the tread depth/condition

In addition to taking medium and close ups, take over-all towards scene and 8 directions away from scene. For night photos open the F-stop up (smaller number such as F-4 or F-2).



When taking photos from an eyewitness point of view, take photos from the witness to the scene and from the scene back to the witness.

Accident Scene

- Scene location identifiers
  - Street signs
  - Major identifiers
    - Landmarks
    - buildings

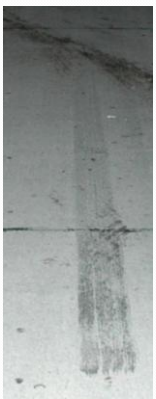
Accident Scene

- Contributing factors to accident
  - Snow / ice
  - Anything that blocks vision of drivers
  - Drug or alcohol usage
  - Roadway signage
  - Evidence of speed
    - Length of scene

Accident Scene

- Accident evidence
  - Gouges / scrapes
  - Skid / yaw marks
  - Seatbelt usage
  - Interior damage or operation
  - Interior contents
  - Seat / Steering wheel positions

Skid marks – lighting is critical

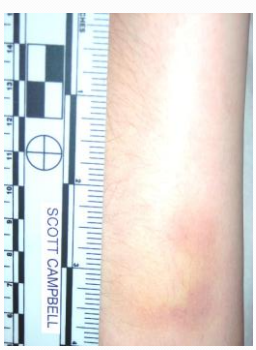


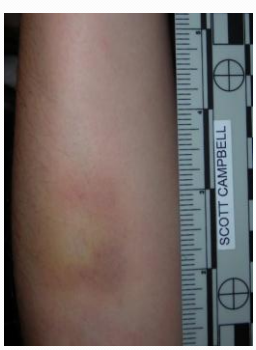
Anatomy

- Treat injury photos just like any other evidence
- Photograph a sequence using all three views such as:
  - Person – overall view
  - Face and upper body with injury to elbow
  - Elbow injury with and without scale
- Knees and Elbows can look the same with only a close up photo
- Use caution so you don't over-expose or wash out with flash too close or too much power

Shin, calf, arm or ?

Flash positioning and power settings can make a difference with bruises.





Draping

- The use of draping will allow you to take photographs of injuries near intimate parts of the body w/o exposing those parts.
  - Explain to the victim what photos you will be taking and why they are needed
  - Have hospital staff drape victim using a clean hospital bed sheet
  - It's a good idea to have a witness present such as someone from the hospital staff while photos are taken

After the overall photo, add a scale near the injury, photograph again followed by medium and close up photos.

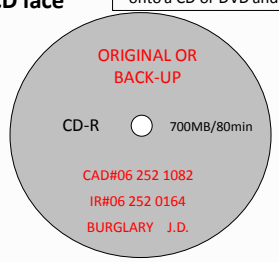
Archiving Images

- Crime scene photos are evidence
- A standard operating procedure (SOP) should be used or established to ensure consistent integrity of photographic evidence
- SOP should spell out who takes the photos, by who and how the images are uploaded or burned, and responsibility for storage and retention
- Images should be archived or saved in a combination of locations such as CD, DVD, Hard Drive, Records Management System, etc.

Downloading images to CDs

Documentation on the CD face

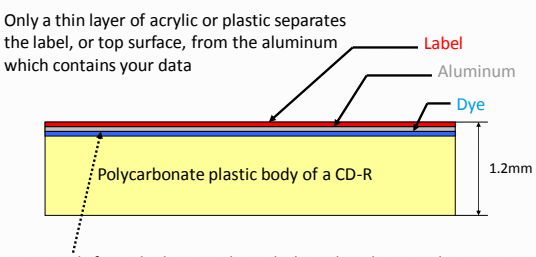
One **Original** and one **Back-Up** CD-R can be created for each assignment. Burn each onto a CD or DVD and label each properly.



Other info that can be added:
CAD Number,
Incident Number,
Type of Case,
Your Initials

Only approved Sharpie CD/DVD markers should be used

Permanent markers and adhesive labels can deteriorate data on CD's. Only use markers designated safe for CD/DVD surfaces



Photographic ID Card

- Typically should be the first or last shot in the series of photos
  - Best if card is pre-made
- It is used to establish a connection/chain of evidence of the photos to your scene
  - Also helps if the photos or CD gets misplaced

Photographic ID Card

- ID Cards could show (whatever works best for your department)
  - Agency name
  - Photographer
  - Case number
  - Time
  - Date
  - Media card number
  - Location / Address
  - Case Type

POLICE DEPARTMENT NAME

PHOTOGRAPHIC RECORD SHEET

LOCATION:_____ *Sample*

_____

DATE:_____/_____/_____TIME:_____

TYPE OF INCIDENT:_____

_____

PHOTOGRAPHER:_____

CAMERA BODY:_____ FLASH CARD:_____

Records – Photographic log

- Record specific information about **each** photo (could include):
  - Address and/or location within the scene
  - Camera, lens, and flash used or not used
  - Photo or frame number
  - Describe item photographed, distance from camera and direction camera is pointing
  - Date, time
  - Any other information deemed appropriate by your department

You should document every photo!!!

Records – Photographic log

- Can assist those who review the photos to understand what your intent was, or for those that must use the photo evidence for reconstruction such as fire scenes, accident scenes or blood patterns
- Remember, you can't always collect all evidence from your scene such as a tire skid mark. It would be important to know which vehicle it came from, what direction it was going, and the sequence if more than one mark exists.

PHOTOGRAPHIC ASSIGNMENT LOG Page____of____

Location_____Date_____
Type of Case_____Time_____
Photographer_____Squad #_____
Victim_____Invest. Squad #_____
Vehicle #1_____License #_____
Vehicle #2_____License #_____
Incident #_____Other #_____
Misc:_____
Camera #_____ Media #_____ Total # of Photos:_____

Photo No.	Lens Height	Camera Direction	Description of each photo

Sample

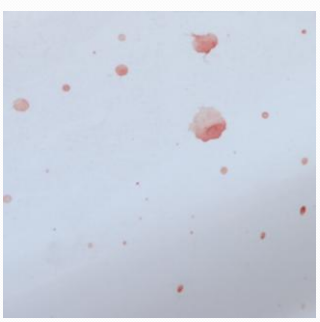
Additional tips and things to think about

Equipment Care

- Rain / Snow
  - Use a "Rainsleeve ™" or 1 or 2 gallon zip lock bag to cover the camera and lens or flash
  - Cut holes for lens and operate camera from opening in the bag
- Digital equipment is much more sensitive to moisture than manual film cameras so use an umbrella or improvise with rain gear or a large piece of cardboard held overhead

Remember, with the camera on "Automatic" with flash, the camera many times will open the aperture to 5.6

Instead, use a smaller aperture. Just changing from F5.6 to F8 can add depth and better detail



How large are the blood spots?

Make sure to add a scale

Hit & Run Accident Scene

WDK-710 OR WCK-710

Which photo shows the right side next to the auto better?

Open the F-Stop and increase flash power manually.

Lens Flare

When done manually, the results are much better!

Questions or Clarifications?