Photo Boot Camp

Camera Obscura

- Camera "room"
- Obscura "dark"
- Inverse square law



The Camera/Eye Comparison







กาพที่ 1 หลักการเกิดกาพในกล้องรูเข็ม

World's First Photo



Joseph Nicephore Niepce, 1827

Pinhole Camera



Pinhole Image



Pinhole Original



Pinhole Inverted in Photoshop



Negative/Positive



World's Largest Photo



Pinhole Camera

Film Speed

ISO and ASA

- ISO International Standards Organization
- ASA American Standards Association

ISO rating on your film

- ISO designates the film's or CCD's degree or of sensitivity to light
- Higher number ISOs mean more sensitive to light can be used in lower light settings (generally)
- Lower number ISOs mean it is less sensitive to light and is used for brighter settings (generally)

ISO Sensitivity

• The sensitivity of film to light has to do with the density of the silver halides on the film or sensors on the CCD are amplified at higher ISOs







Low Density High Density





How does ISO affect print quality

- Lower ISO films/digital images are more dense, and thus are less grainy when made into a print
- Higher ISO films/digital images are less dense, and thus can be more grainy when enlarged

High ISO (maybe 1600 ISO)





Low ISO (maybe 64 ISO)



Ansel Adams

Low Density High Density





Higher ISO allows for faster shutter speeds but noise can be created



f/5 @ 1/60 (slow) ISO 200 (lower number)

(aperture setting remains constant)



f/5 @ 1/80 (a little faster) ISO 400 (a little higher)



f/5 @ 1/200 (faster) ISO 800 (higher)



f/5.0 @ 1/400 (quite fast) ISO 1600 (much higher)

More noise present



Changing ISO

- **ISO** can be changed depending on lighting conditions development time must be altered accordingly (called a push or pull)
- ISO (generally) should not be changed in the middle of a shoot on a film camera
- ISO may be changed from exposure to exposure on a digital camera



Light Meter

- Purpose = tells you how much light is being allowed into the camera based on the current APERTURE, SHUTTER SPEED, and ISO settings
- Averages all light in scene to 18% gray which is ZONE V on Zone system scale
- Is correct most of the time





ZONE	DESCRIPTION
0	Maximum black
Ι	The first tone distinguishable from black with no detail
II	The first visible texture in a very dark area
III	Black with detail—a highly textured dark area with distinct detail; this zone is considered the shadow detail area for average value metering
IV	Dark gray
V	Middle gray, with 18 percent reflectance
VI	Light gray
VII	White with detail; the lightest area in the photograph that will have distinct texture or detail; this is the highlight area for the average value method
VIII	The brightest tone distinguishable from white
IX	Paper white





• Tone to which all light meters average the light given off by the scene which is being photographed



What Light Meters Look Like


Shutter or f-stop reading light meter

- 1000 • 22 • 500 • 16 • 250 • 11 • 125 • 8 • 60 • 5.6 • 30 • 4 • 15 • 8 • 2.8
- 4
- 2
- 1

Needle light meter





Over Exposure



Underexposure



What is a Stop?

• A change in an exposure setting, either aperture or shutter speed, that either doubles or halves exposure

•x2 •or ½

Aperture

Also known as f-stop

Aperture

Controls opening's size during exposure

Another term for aperture: f-stop

Controls Depth of Field



Why does a larger f-stop number actually represent a smaller aperture opening?

Higher numbers – smaller opening of the aperture?

- F-stop numbers represent fractions
- The f-stop number represents the denominator
- For example f-22 = 1/22, f-5.6 = 1/5.6

Each full stop on the aperture (f-stop) either doubles or halves the amount of light let into the camera





Light is doubled this direction

Where do these strange f-stop numbers come from?



Diameter is 1/1 the distance between film and back end of lens



Diameter is 1/2 the distance between film and back end of lens



Diameter is 1/4 the distance between film and back end of lens

Numbers based on a Logarithmic Calculation

RELATIONSHIP BETWEEN APERTURES AND TIME



The above equates aperture and time as equals with regard to effect on exposure - i.e., be aware that each halving of time equates to a halving of aperture cross-sectional area, and thus, each step of halving (or doubling) has the same effect on the light transmitted to film. For example - a reduction of f2 to f2.8 causes a halving of light transmitted, as would a reduction in exposure time from, say, 1/4 sec to 1/8 sec.

How Stops Work with the Aperture (f-stop)



1 1/3 Stop Over Exposure



2/3 Stop Underexposure





-1

Bracketing





+1







Shutter Speed

Each full shutter speed stop either doubles or halves the amount of light entering the camera

How Stops Work with the Shutter Speed

1/125 to 1/250 cuts the amount of light in half ½

1/60 to 1/30 doubles the amount of light x2

Why does a larger shutter speed number represent a faster shutter speed?

Doubling Comparison for Shutter Speeds

- Doubling Sequence
- 1
- 2
- 4
- 8
- 16
- 32
- 64
- 128
- 256
- 512
- 1024

- Camera Shutter Speeds
- 1
- 2
- 4
- 8
- 15
- 30
- 60
- 125
- 250
- 500
- 1000

Higher numbers mean faster shutter speeds?

- Shutter speed numbers represent fractions as well
- The shutter speed number on your camera is the denominator
- For example, 125 = 1/125 of a second, 1000 = 1/1000 of a second

Equivalent Exposure

How is a darkroom test strip like a camera's light meter?





They both tell how much light is being allowed into an exposure and help you to pick the correct amount of light using your aperture and proper time (either timer or shutter speed)

This is something called Equivalent Exposure

Which will be explained now...

Photography – Greek

photo = light graphy = writing



What is an exposure?

Which one is properly exposed and what happened to the others?





А



С

В



Under Exposed





В

Over Exposed





Properly Exposed





- Combined effect of *volume* of light hitting the film or sensor and its *duration*.
- Volume is controlled by the aperture (f-stop)
- Duration (time) is controlled by the shutter speed





Equivalent Exposure



Properly Exposed


Objectives of Equivalent Exposure

- To create the proper aperture and shutter speed on the camera given:
 - the light conditions
 - the ISO setting
 - the effect you wish to create (effects might include, shallow or large depth of field, blur or freeze motion)

Equivalent Exposure

 denotes all combinations of shutter speed and relative aperture settings that give the same amount of light striking the light sensitive surface

Equivalent Exposure

- Given that your light is constant,
- If you:
 - increase shutter speed (less light) you must open up aperture (more light) the same amount of stops
 - decrease shutter speed (more light) you must close down aperture (less light) the same amount of stops

Why is Equivalent Exposure important?

- To expose your film properly (not to light or too dark)
- As you shoot in different light conditions or shoot for different effects you must change your apertures and shutter speeds accordingly

		Shutter Speeds Fractions of seconds	Apertures Fractions		
Ť		1	f/22		
	More Light	2	f/16	Less Light	
		4	f/11		
		8	f/8		
Less Light		15	f/5.6	More Light	
		30	f/4		
		125	f/2.8		е
		250	f/1.7		nt
		500			
		1000			
		2000			

Aperture and Depth of Field

Depth of Field

• The zone of sharpness variable by aperture, focal length, or subject distance

perfocal distance opposit are using. If you the the depth of field will ce to infinity. For amera has a hyperf



Wide Aperture

Small Aperture







f/8







Depth-of-Field Factors







50mm 2' away

f/22 50mm 2' away



Wide Aperture





Large Depth of Field



Shot at f/22

Jacob Blade

Shallow Depth of Field



Shot at f/4

Keely Nagel



Shutter Speed

Shutter Speed and Motion

Fast Shutter Speed



1/1000

Freeze Motion

Slow Shutter Speed

1/60

Blur Motion





Pan Motion





What is the optimal shutter speed to create pan or blur motion (when the camera is hand-held as opposed to on a tripod)?

1/60

Motion

Blur





Motion

Pan





White Balance









If color film is not designed for certain kinds of light, a filter must be installed on the end of the lens









Tungsten

AWB

Shade





Cloudy



Fluorescent

Sunny
White balance is a function of a digital camera used to compensate for

different colors of light being emitted by different light sources. In

digital photography the term is generally used to describe a function

of a digital camera that allows you to calibrate the device to correctly

display the color white. Once this calibration has been done, the

camera should then display other colors correctly as well.

RAW vs. JPEG

- RAW files are massive and hold the most information
- Cannot set White Balance on RAW – White Balance is adjusted in post production
- Files cannot be opened without certain software
- Professionals use RAW all the time – files are better quality and white balance is not an issue

- JPEGs (Joint Photographic Experts Group) are compressed Files – take up less space
- White Balance must be monitored and adjusted as necessary
- Files can be opened anywhere
- You can use JPEG or RAW in this class





PSD and TIFF

- PSD = Photoshop Document
- Save any image you have edited on Photoshop as a PSD (File > Save As > PSD)
- It has all of your edits and the file is large

- TIFF = Tagged Image File Format
- Does not compress files like JPEGs do – good to store your files as TIFFs
- File conversion can be done in Photoshop (File > Save As > TIFF)

Shooting Modes



Some Auto Modes (dummy modes)













Manual Mode – Most Control



- Shutter is usually changed by moving the dial
- Aperture is usually changed moving the dial while holding the +/- button also might have the aperture symbol next to it



For Shutter on Manual Mode

For Aperture on Manual Mode







S or Tv Mode (Shutter Priority or Time Value Mode)



You set shutter speed, camera sets the aperture

A or Av (Aperture Priority or Aperture Value Mode)



Change aperture by moving dial

You set aperture, camera sets the shutter speed

Exposure Compensation while on Program, S (Tv), or A (Av) Modes



- Hold +/- button while moving dial
- This current displayed setting would overexpose every shot by one stop



DPI, Resolution, and Image Size



Resample clicked keeps resolution static when image size changing

Adjustment: Styles Add an adjustment: Add an adjustment: Mathematical State Image Size Wdth: 1000 Pxeels] 8 Height: 100 Pxeels] 8 Mathematical State		LLAYET 1, NUD/57 X	Color Swatches	
Pixel Dimensions: 2.86M (was 19.1M) OK Width: 1000 Pixels]3 Height: 1000 Pixels]3 Occument Size: Width: 10 Inches]3 Width: 10 Inches]3 Auto Scale Styles Constrain Proportions Scale Styles Constrain Proportions Resample Image: Bituher, Automatic		Image Size	Adjustments Styles Add an adjustment	-
Image: State Styles Image: State Styles Image: State Styles Image: State Styles		- Pixel Dimensions: 2.8	6M (was 10 1M)	
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Height: 10 Inches - 3 Resolution: 100 Pixels/Inch - 3 Scale Styles Constrain Proportions Resample Image:	105-21	Document Size:	Inches -	Auto
Resolution: 100 Pixels/Inch Scale Styles Constrain Proportions Resample Image: Resample Image:		Height: 10	Inches 3	
Scale Styles Constrain Proportions Resample Image:		Resolution: 100	Pixels/Inch -	
Dicubic Automatic	1	Scale Styles Constrain Proportions Resample Image: Bicubic Aut	comatic	

Resample – not checked keeps resolution moving with image size



Image Size and Resolution are Inversely Related (when resample is not checked)

- When resolution goes up, image size goes down
- When resolution goes down, image size goes up

Very important to make sure you are aware of this when re-sizing your images so you don't accidentally lose resolution

Re-sizing is done when preparing to print

Your resolution should be 150 DPI or higher for printing

You cannot artificially increase DPI!!!!

It will only make it worse – if you lost resolution, it is gone forever

(unless you backed up your file elsewhere like Mr. Lindroth tells you to do)

