LANGARA COLLEGE CERTIFICATE PHOTOGRAPHY PROGRAM

Basic Digital Photography Week 2

Now we're going to look more closely at exposure controls, with the goal of ensuring your pictures will be consistently well-exposed.

Aim of Exposure: to produce a pleasing image, technically capturing the creative intent of the photographer

under-exposed

"correct" exposure

over-exposed

Exposure Components:

1. Aperture (F-stop) = Half of Total Exposure
2. Shutter Speed = Half of Total Exposure
3. Sensitivity (ISO)
4. Light Measurement (Light metering modes)

Review:

1. **Aperture** (F-stop) controls:
   -amount of light entering the lens and striking the sensor
   -changing F-stops will halve or double exposure
   -amount of Depth of Field (DOF)
   -stopping down the lens (smaller aperture diameter)
   increases DOF
   -opening up the lens (larger aperture diameter)
   decreases DOF

2. **Shutter Speed** controls:

-duration of time image sensor is exposed to light,
measured in full seconds and fractions of a second

-changing shutter speeds will halve or double exposure

-effect of subject motion

-Blurring motion = 30 (1/30) and slower

-Freezing motion = 500 (1/500) and faster

-Panning motion = 15 (1/15), 30* (1/30), 60 (1/60)
* most common, depending upon motion speed

3. LIGHT SENSITIVITY (ISO):

Definition: the number indicating the camera sensor's sensitivity to light. ISO numbers for digital and film are the same, e.g. 50, 64, 100, 200 etc.

-the higher the ISO number, the more sensitive the image sensor is to light, therefore:

- less light needed for exposure

-more noise* is produced

(*noise = randomly-spaced, multi-colored pixels, commonly found in shadow areas)

-the lower the ISO number, the less sensitive the image sensor is to light, therefore:

-more light needed for exposure

-less noise is produced

Noise Types: (can be thought of as synonymous with film grain; some cameras produce "prettier" noise than others)

-luminance noise: patterns of changing luminance,
giving texture to shadow areas much like film grain

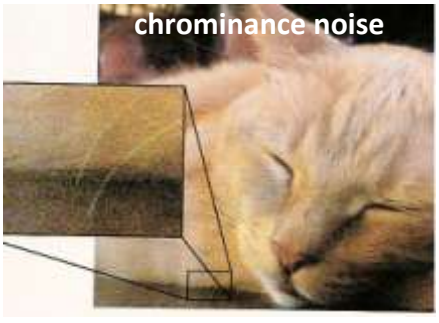
-chrominance noise: splotchy patterns of color,
usually in shadow areas appearing as red or
magenta splotches; difficult to remove

Noise mitigation:

-noise effects will increase with image enlargement

-noise can be reduced with some editing in post-production

examples:



Halving and Doubling of Exposure (ISO):

-Halving the ISO number will double the required exposure
-Doubling the ISO number will halve the required exposure

comparisons: ISO (Sensor Sensitivity)

slower ___50_____100_____200_____400_____800_____1600___ faster
less sensitive [1 stop] more sensitive
less noise more noise

-ISO 400 is twice as sensitive to light as ISO 200 and four times as sensitive as ISO 100

***-remember**:* every doubling or halving of light is measured as a stop; thus:

ISO 200 to 400=stopping down the aperture 1 stop or = 1 stop faster shutter speed
ISO 400 to 200=opening up the aperture 1 stop or = 1 stop slower shutter speed

ISO Control - Digital Advantage:

-you can adjust the ISO on a shot by shot basis

examples:

-low-light shooting: if needing more DOF or a faster shutter speed for hand-held shooting, you can increase your ISO to have the desired f-stop and/or shutter speed


ISO 100


(no tripod) ISO 800

-freezing action: increase your ISO to gain a faster shutter speed to freeze motion

ISO 100

ISO 1600

-shallow DOF: decrease your ISO to facilitate an opened up aperture (less DOF) for a blurred foreground/ background around your subject

ISO 1600 (F16)

ISO 100 (F4)

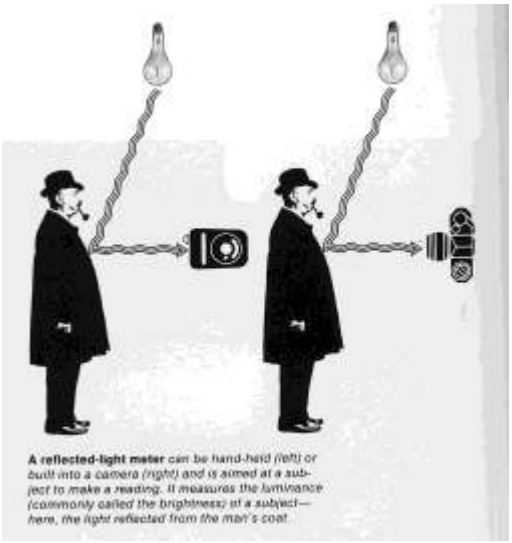
-you can pre-select an ISO warning number (Camera Set-up Session#1) i.e.; to warn against increased noise @ higher ISO
-you can pre-select an Auto sensitivity range of ISO; i.e., ISO 100~400, when using semi-automatic modes (Av or Tv)
-***remember**:* in Manual (M) mode, ISO cannot be set to Auto and must be manually set

4. LIGHT MEASUREMENT:

All cameras come equipped with a light-measuring device called a meter, which reads the intensity of the light and then tells the photographer which F-stop and Shutter Speed combination will provide good exposure. Without this tool, exposure would, obviously, be hit-and-miss, so it is an integral part of the photographers equipment. There are two types of meters.

A. **Reflected Light Meter**: built into all Digital cameras and also available in a hand-held model.

-reads or measures light reflecting from the subject
-tonal make-up of subject influences the reading.



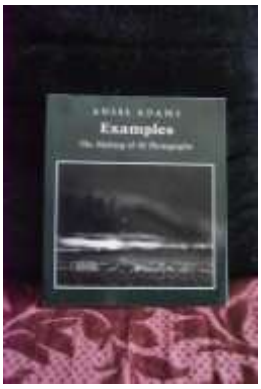
A reflected-light meter can be hand-held (left) or built into a camera (right) and is aimed at a subject to make a reading. It measures the luminance (commonly called the brightness) of a subject—here, the light reflected from the man's coat.

FACT: All reflected light meters read the scene as though it were a mid-tone or a luminance of 18% gray or **middle grey**

What this means is that your camera averages out all of the tones in its viewfinder to a middle grey, regardless of how light or dark the tones are. It then recommends settings based on that averaging to produce (correct) exposure. This works most of the time, although in some circumstances the results will be over or under exposure, due to the dominance of light or dark tones in the scene.

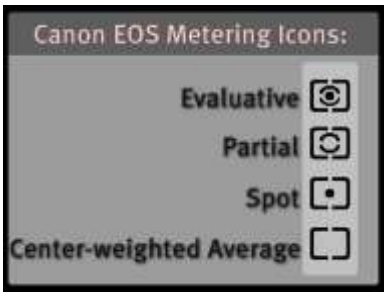
Examples:

metered exposure the actual scene

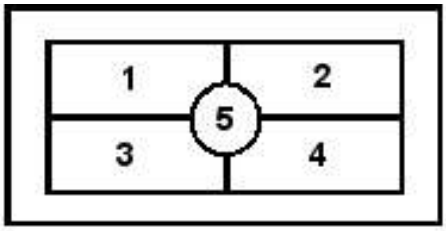


metered exposure actual scene

Variations:



1. Matrix or Evaluative (Multi-segment)
   - divides the image into a grid and takes separate meter readings for each cell, determining what level of brightness is in each segment to produce an averaging of the scene (extreme light and dark cell tones are eliminated from the averaging)
   -considered the most accurate for average scenes



matrix metering

2. Center-weighted:
   -measures the entire scene with an emphasis on the centre; typically up to 80% of the middle grid cells are given preference

-caution: your main subject must be in the centre of the frame
for accurate metering

3. Spot metering (Partial is similar, though meters a larger area)
   -measures only a small area of the image in the center
   -useful for smaller, far-away subjects and backlit situations

remember: These metering systems give you an averaging based on the assumption that it is measuring an image that is 18% gray
-use your EV compensation bar to over or under-expose, to increase contrast, saturate colors or to give greater detail in the shadows
-your viewfinder and LCD screen are not an entirely accurate representation of your exposure, especially in terms of contrast/colour.

Histograms:

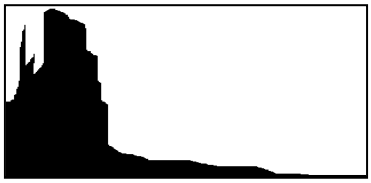
In-Camera Histograms: helpful in determining true exposure. The histogram appears automatically when each picture is captured (use toggle switch to scroll to histogram/image info).

Definition: a simple bar graph showing the distribution of the range of tones from dark to light; each vertical line representing one shade. Black is on the far left and white is on the far right.
Example:

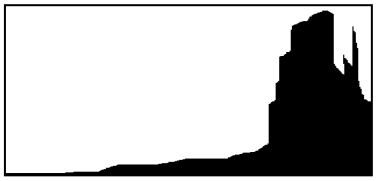
dark_____brightness_____light

note: **There is not a "perfect" histogram graph, as every subject has a different distribution of tones; the aim is to avoid "clipping" or cutting off the natural sloping of the curve to nothing at the edges of the graph.**
<u>Also:</u> If is subject is mainly dark or mainly light, the graph will move toward the left or right side of the histogram

Histograms showing obvious under or over-exposure and clipping:



too dark-under-exposed



too light-over-exposed

Blinking Highlights/Shadows:

Important- When shooting JPEG, over-exposing highlights can result in an area of empty white space; however, RAW shooting offers a highlight recovery feature in most post-production software to rebuild the lost information.
-blinking shadow warnings are important, as the brightest values are captured first by the camera sensor; thus, leaving less information available for capture, resulting in noise.

B. Incident Meter:

-reads or measures light striking the subject
-reads the light source (through an opaque dome, simulating an 18% luminance of the light source)
-only available as a hand-held model
-useful when the subject does not contain an "ideal" 18% luminous or an averaging midtone throughout.
-must be used in studio flash photography

Grey Card:

-a prepared 18% luminance grey card representing the mid-tone all light meters are programmed to read
-can be substituted for the subject in place of using an Incident Meter

To use: grey card is placed in front of the subject angled midway between the camera and the light source; reading is taken off the grey card, isolated in the camera's viewfinder. Shutter speed and F-stop are then set, grey card removed, and picture taken!

metered exposure grey card exposure

Applications of Built-in Camera Reflected Meter:

1. Average reflected reading:
   -taken from the composition point where whole scene is included in the exposure calculation
   (Matrix or Evaluative {Multi-segment} reading)
2. Highlight reading:
   -taken from the brightest part of the subject, isolated in the viewfinder
   -results in an under-exposure or darker image with greater contrast
   (Matrix or Spot metering, depending upon highlight)
3. Shadow reading:
   -taken from the darkest or shadow area of the image, isolated in the viewfinder
   -results in an over-exposure or lighter image with shadow detail (Matrix or Spot, depending upon shadow)
4. Grey Card reading (see above)

THESE METERING STYLES WILL BE APPLIED DURING NEXT WEEK'S FIRST MAJOR ASSIGNMENT!!

WHITE BALANCE:

Definition: a function on the Digital camera to adjust the colour temperature of the image to match the light source (so that it any light source, white objects appear white)

Camera Set-up:

A. Fn Button-
   -AWB or Auto is **satisfactory** for most daylight situations
   -usually automatically adjusts the white balance between 4000-8000 degrees **Kelvin**
   -default setting is AWB or Auto
   -note the various white balance settings available in your digital camera

   Daylight
   Cloudy
   Shade
   Incandescent (Tungsten)
   Fluorescent
   Flash

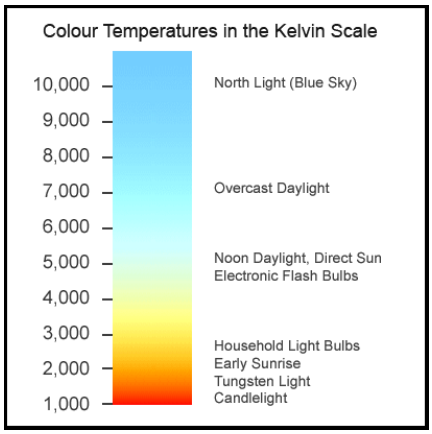
Kelvin (manual control)

-*Important:* When shooting in JPEG, the white balance must be carefully monitored and adjusted, as it is difficult to change it during post-production
(RAW shooting: white balance editing in post-production is available)

Adjusting the White Balance Manually:

-Fn function button:
-select manual white balance
-under the same light as the subject, display a white card in the viewfinder **(refer to your camera's manual on procedure to set the white balance manually).**

Or, Adjust White Balance with Colour Temperature if known:
-Fn function button:
-select Colour temperature-(refer to your camera's manual on procedure to set color temperature)



WORKFLOW OPTIONS:

Definition: the post-production process of organizing, filing and editing your digital images

Procedure:

1. Downloading from the camera to the computer:
   -USB2 card reader or Firewire (not as common) or insert SD memory card into computer compatible slot
   (avoid using the USB cable from camera to computer as it uses too much battery power)

-after downloading, do not erase your images from your SD memory card in the computer; instead, reformat the card in your camera before shooting again*

2. Renaming Files, keywording:
   -easiest done while downloading or as a batch
   -use your operating system's file manager to rename your images and organize them into folders of your choice
   -(or) use a workflow application like Lightroom, to perform the same tasks (see below)

3. Backing Up your Files:
   -DO IT!
   -always have at least two copies of your files at all times
   -burn them to recordable CD's or flash drives

4. Post-processing – correcting and editing:
   -software provided with the camera
   -Adobe Photoshop 7.0
   -Adobe Photoshop CS2, CS3 or CS4
   -Adobe Photoshop Lightroom: JPEG and RAW
   -(free 30-day trial of Lightroom: for Mac or PC Windows
   www.adobe.com/go/trylightroom.