CAMERA CONTROLS

BEYOND THE BASICS

BASIC CONCEPTS

- Shutter speed
- One stop
- Aperture, f/stop
- Stopping down, opening up
- Lens speed, maximum aperture,
- Depth of field and focal length / focus distance

SHUTTER SPEED

- When the shutter is closed no light can enter; when it is open light may strike the film or imaging sensor
- The interval between the shutter's opening and closing is called the shutter speed.

SHUTTER SPEED

- The shutter speed times are represented in fractions of one second.
  - A setting of 60 means that the shutter is open 1/60 sec. A typical sequence of shutter speeds are 1, 2, 4, 8, 15, 30, 60, 125, 250, 500 and 1,000
- Each shutter speed is double the preceding one.
  - Depending on which direction the shutter speed is adjusted, the exposure will be either doubled or halved. To do so would be adjusting the exposure by **“one stop.”**

1/60 sec.

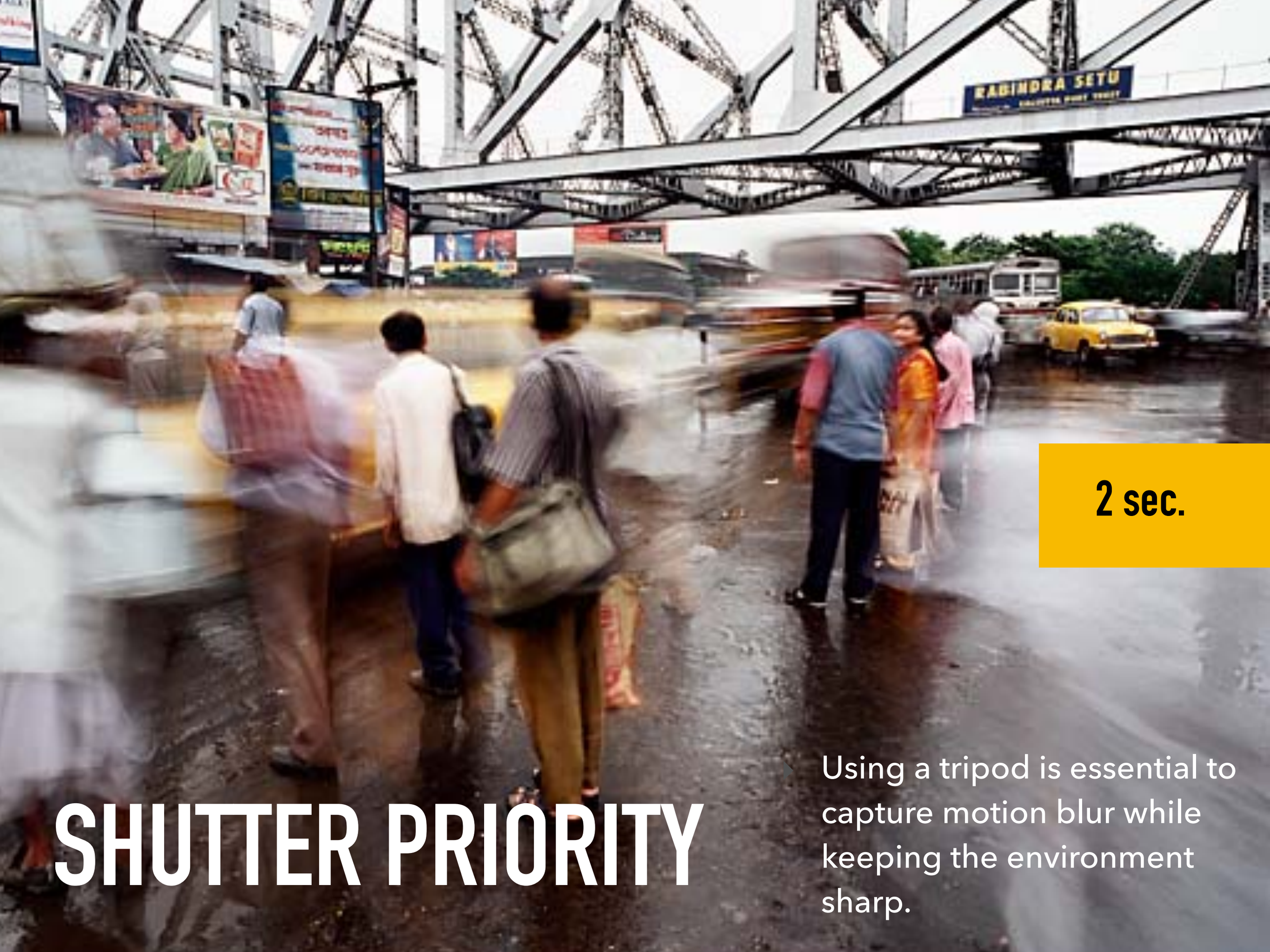
SHUTTER PRIORITY

Using the shutter speed to freeze motion. To have a sharp hand-held photo, you must be 1/60 sec. or above. You may get away with slower, but will have sacrificed sharpness from hand movement.

1/8 sec.

SHUTTER PRIORITY

Using the shutter speed to reveal a motion blur. Anything under 1/60 sec. may reveal motion blur, but something like this would be anywhere from 1/8 sec. or slower.



2 sec.

SHUTTER PRIORITY

Using a tripod is essential to capture motion blur while keeping the environment sharp.

1/30 sec.

30 sec.

1/400 sec


1/4000 sec.

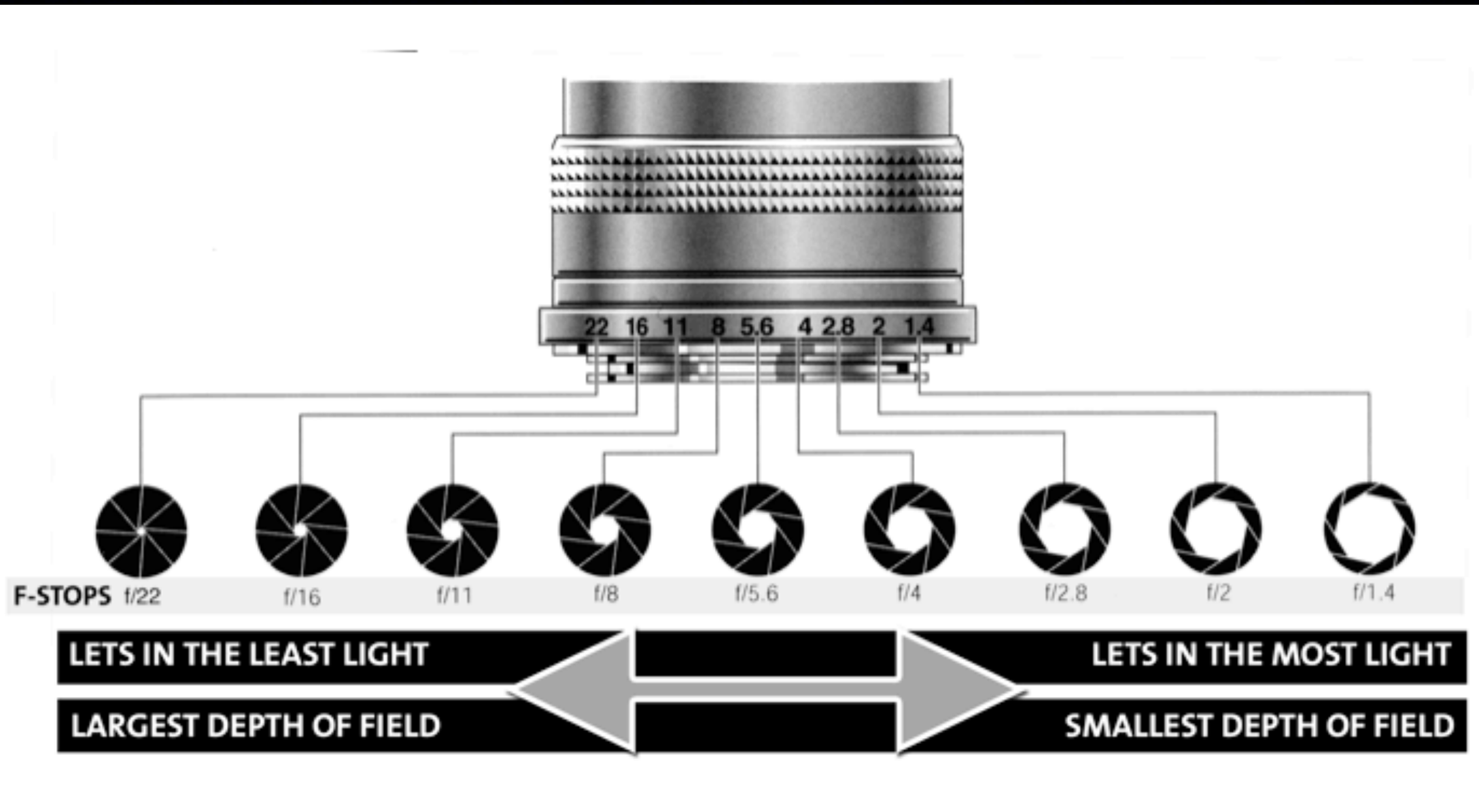
APERTURE

- Light passes through the lens through an opening called an **aperture**.
- If the aperture is large much light passes through; if the aperture is small less light passes through.
- A number called the **f-stop** indicates the size of that opening
  - This number reflects the ratio of the diameter of the aperture to the focal length of the lens

F-STOPS

- Because these f-stops are fractions, the larger numbers represent smaller lens openings while the smaller numbers represent larger lens openings.
- Changing the lens opening from one f-stop to the next is called adjusting the aperture **one stop.**
  - If the stops are changed to make the aperture smaller, this is called **stopping down** one stop.
  - If the stops are changed to make the aperture larger, this is called **opening up** one stop.

F-STOP CHART


22 16 11 8 5.6 4 2.8 2 1.4
F-STOPS f/22
f/16
f/11
f/8
f/5.6
f/4
f/2.8
f/2
f/1.4
LETS IN THE LEAST LIGHT
LETS IN THE MOST LIGHT
LARGEST DEPTH OF FIELD
SMALLEST DEPTH OF FIELD

MAXIMUM APERTURE / LENS SPEED

- The maximum aperture to which a lens can be set is sometimes referred to as the **lens speed.**
- This f-stop is generally inscribed on the front of the lens barrel near the focal length.
  - For example, if the lens reads 50 mm and 1: 1.4, this means that the focal length of the lens is 50 mm and its lens speed, or maximum aperture, is f/1.4.
- F/stops may also read as intermediate speeds, especially on digital cameras. This value usually

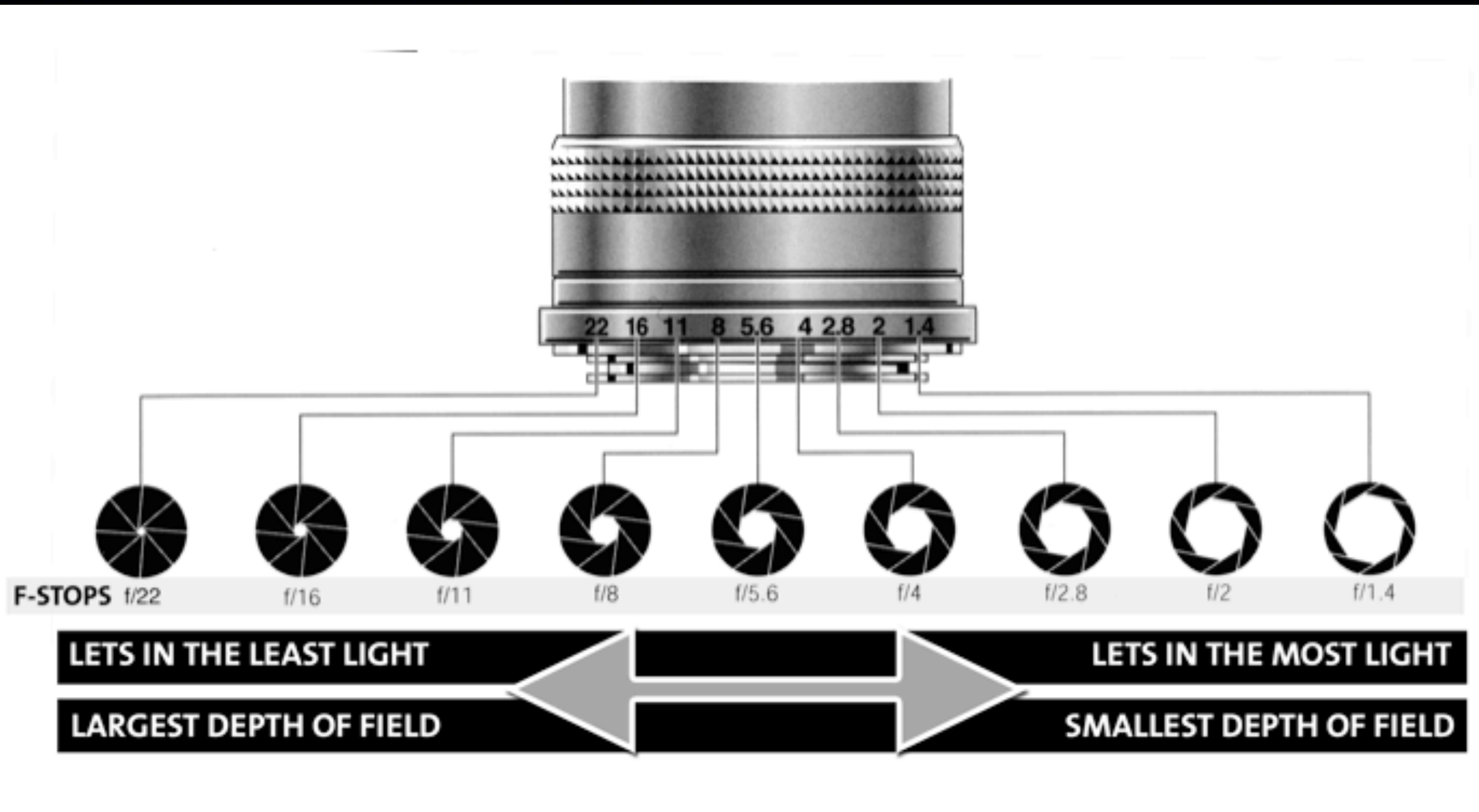
DEPTH OF FIELD

- Depth of field is the distance range in which objects appear in sharp focus within an image.
  - A shallow or small depth of field indicates that only a small distance is in focus.
  - A deep or large depth of field indicates that a large range within the image is in focus.
- The smaller the aperture opening, the larger the depth of field. The larger the aperture opening, the smaller the depth of field

APERTURE PRIORITY

- Using the Aperture Priority setting on your camera, you can select the f-stop you want to shoot at, and the camera will balance the exposure with the correct shutter speed setting.
- For example, if you set the f-stop to f/4 on a sunny day, the camera might set the shutter speed to 2000.
- You can use this program to easily control your depth-of-field with the f-stop you select.

F-STOP CHART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LETS IN THE LEAST LIGHT
LETS IN THE MOST LIGHT
LARGEST DEPTH OF FIELD
SMALLEST DEPTH OF FIELD

f 2.8

f 4

f 7.1

f 11

f 22

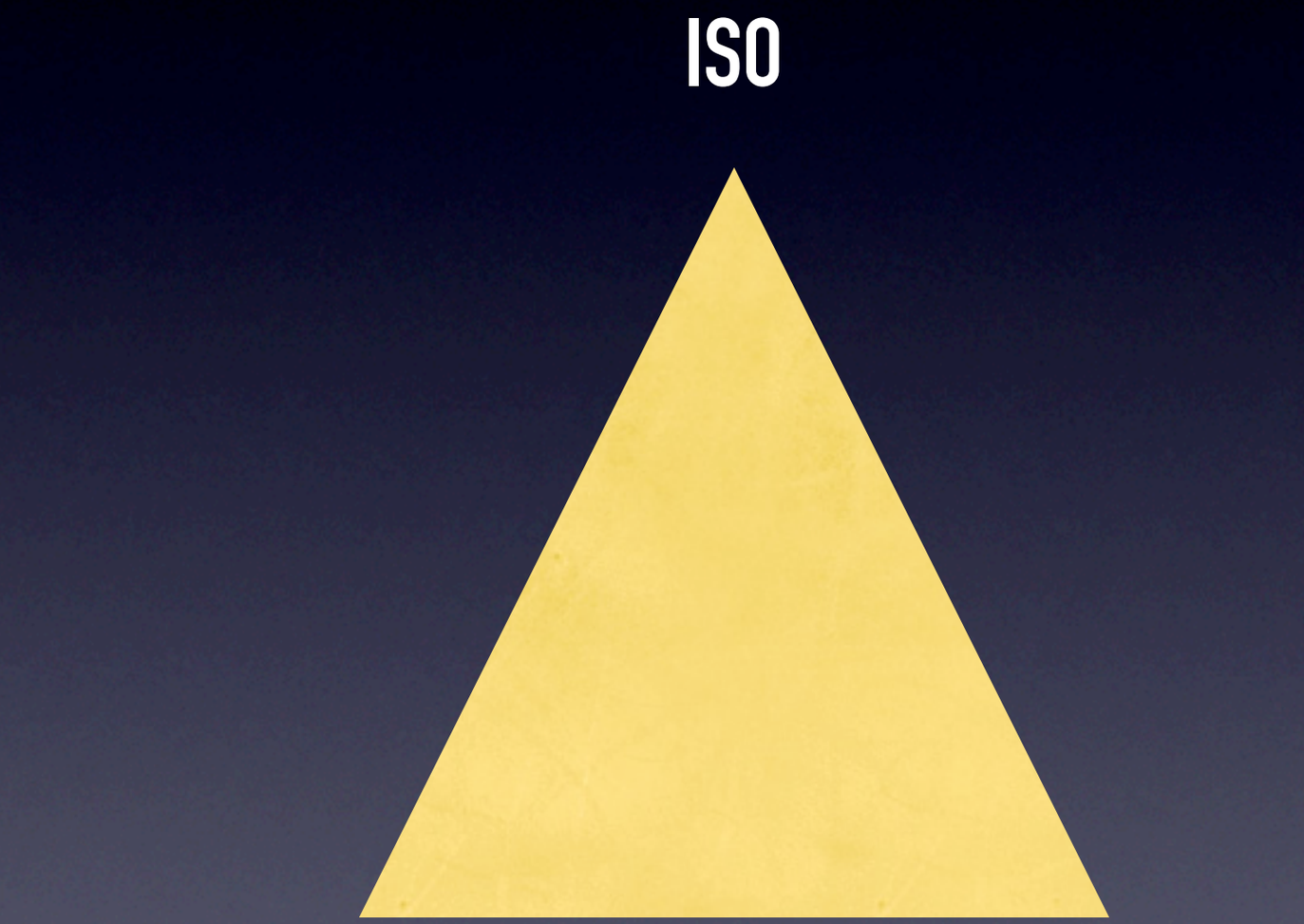
DEPTH OF FIELD & FOCAL LENGTH

- At any given aperture, the shorter the focal length the greater the depth of field. The longer the focal length, the shorter the depth of field.
- Therefore, wide-angle lenses will produce greater than normal depth of field whereas telephoto lenses will produce shallower than normal depth of field.

DISTANCE SETTING & DEPTH OF FIELD

- The distance setting at which the lens is focused also affects the depth of field.
  - When focused on subjected close to the camera, depth of field is reduced.
  - When focused on subjects far from the camera, depth of field is increased.

THE EXPOSURE TRIANGLE



EXPOSURES

EXPOSURE

lighter <----------> darker

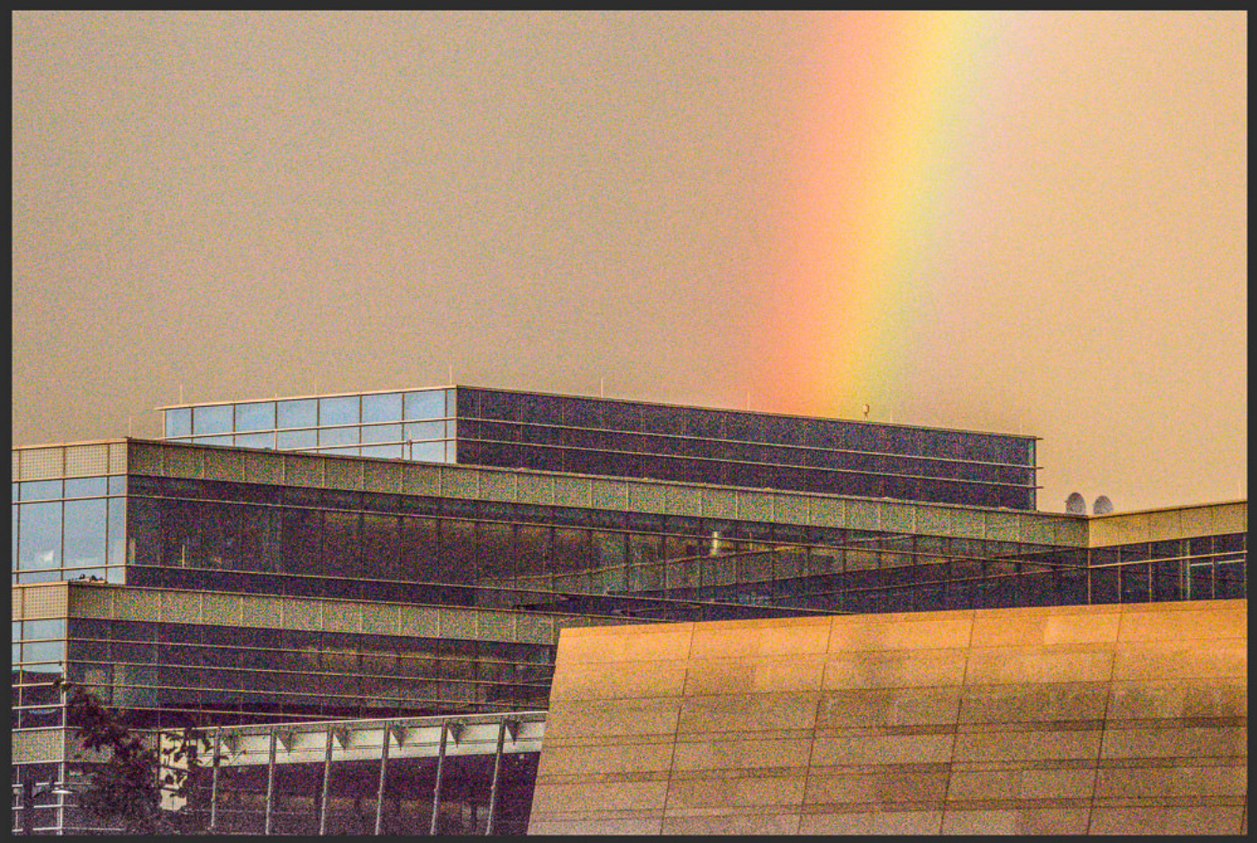
ISO	Shutter Speed (seconds)	Aperture
-noise	-motion blur	+dof
100	1/1000	f22
160	1/500	f16
200	1/250	f11
320	1/125	f8
400	1/60	f5.6
640	1/30	f4
800	1/15	f2.8
1000	1/8	f2
1600	1/4	f1.8
3200	1/2	f1.4
6400	1”	
	2”	
	...bulb	
+noise	+motion blur	-dof

ISO

- Describes the sensitivity of the sensor to light
- The lower the ISO, the less sensitive to light, and the least amount of noise
- The higher the ISO, the higher sensitivity to light, and an increased amount of noise

Comparing the extremes of ISO

ISO 100 (my camera's base ISO)



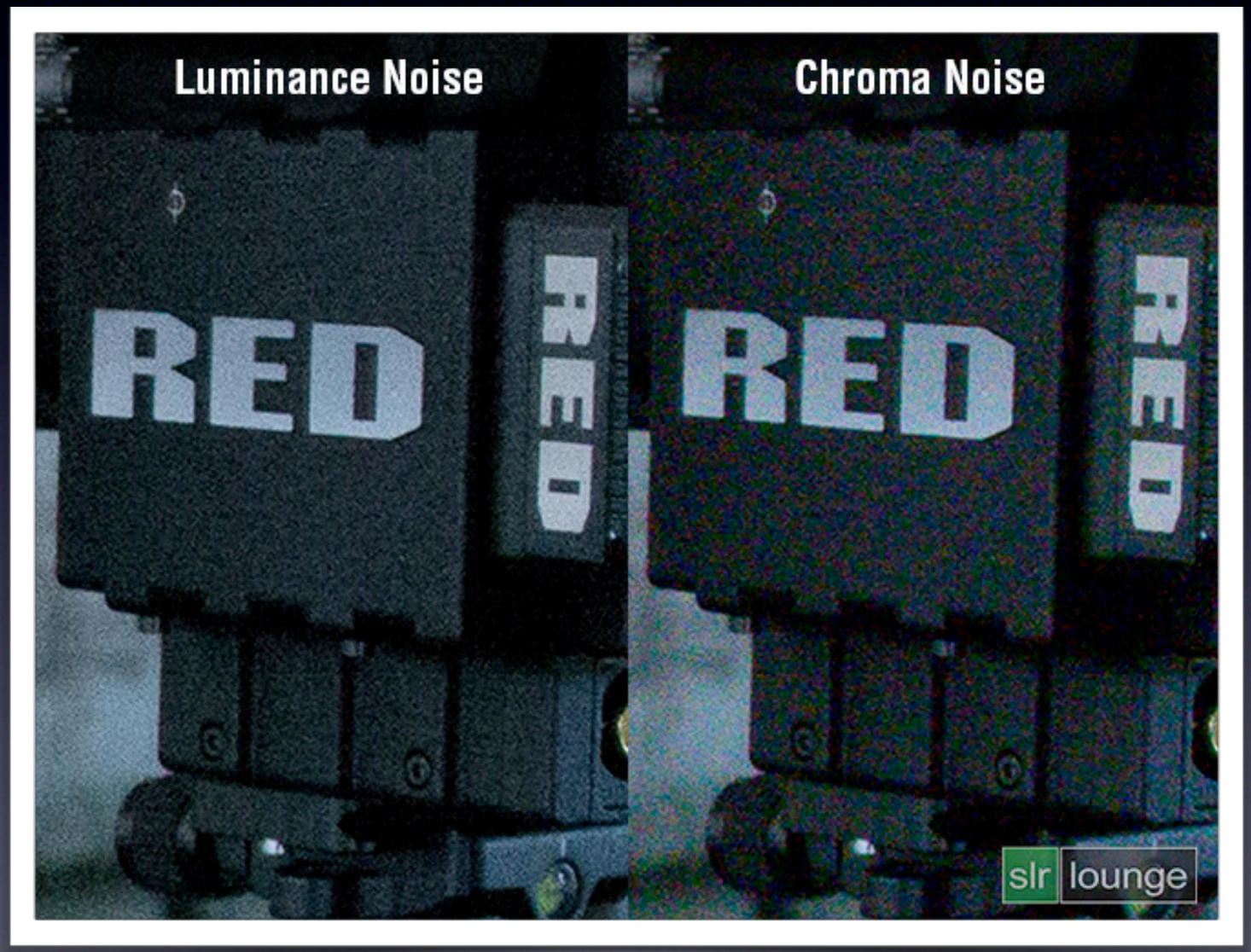
ISO 25,600 (my camera's highest ISO)

RECOMMENDED ISO SETTINGS

- Outdoors with sunny skies: 100-200
- Outdoors with overcast, sunrise and sunset: 200-400
- Well lit interior: 400-800
- Semi-lit interior: 800-1600
- Nighttime exterior or dimly lit interior: 1600-6400
- Indoor or nighttime sports: 1600-8000

TYPES OF DIGITAL NOISE

- Luminance Noise is noise that affects the brightness of the image
- Chroma noise shows up in the color as Red, Green and Blue
- Most effectively removed in Camera Raw

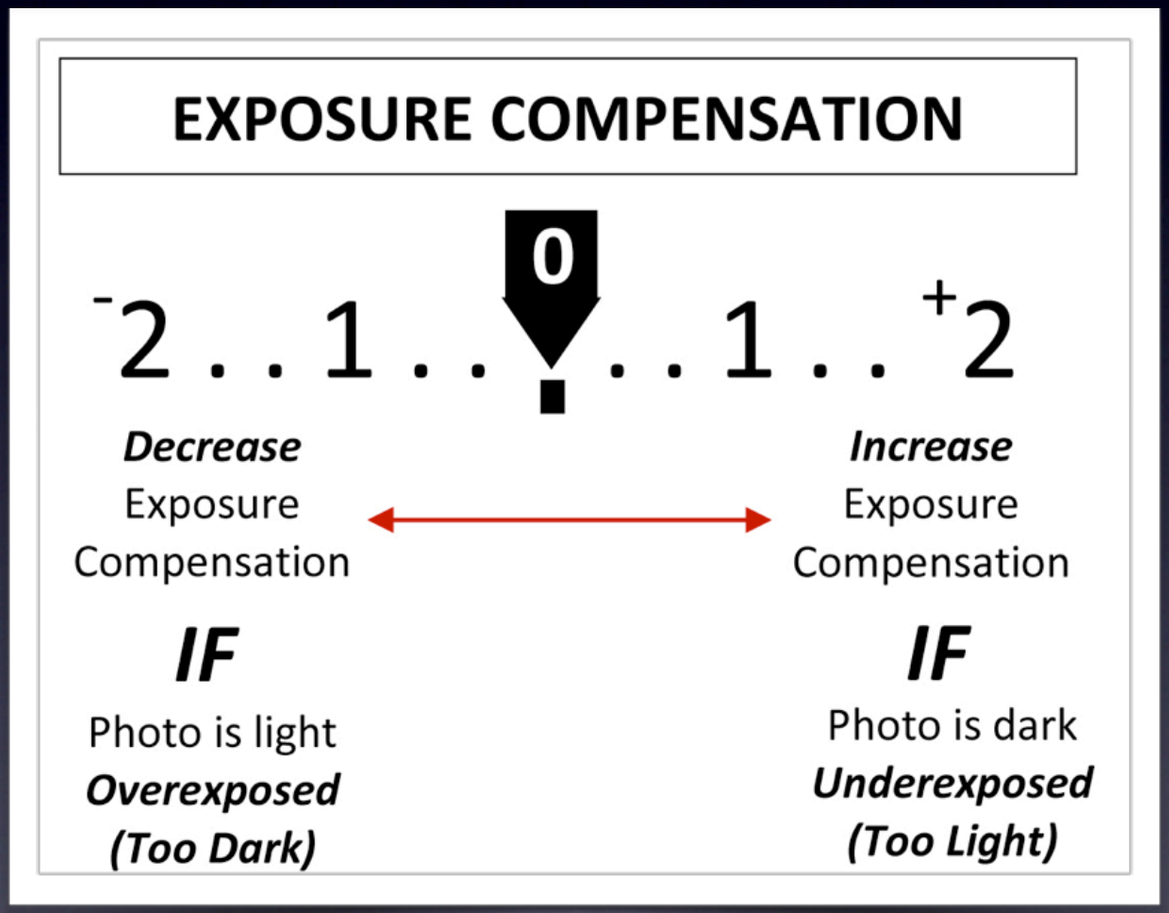


MANUAL EXPOSURE

- To manually expose an image, adjust the ISO to the desired setting based on the lighting conditions.
- Next, adjust the aperture setting (f-stop) and shutter speed until the exposure dial is centered on the 0. This is a balanced exposure based on the metering system you have selected

EXPOSURE COMPENSATION

- Allows the user to adjust the exposure up to two stops either way without being in Manual mode
- Very useful for making exposure adjustments while in Av or Tv modes

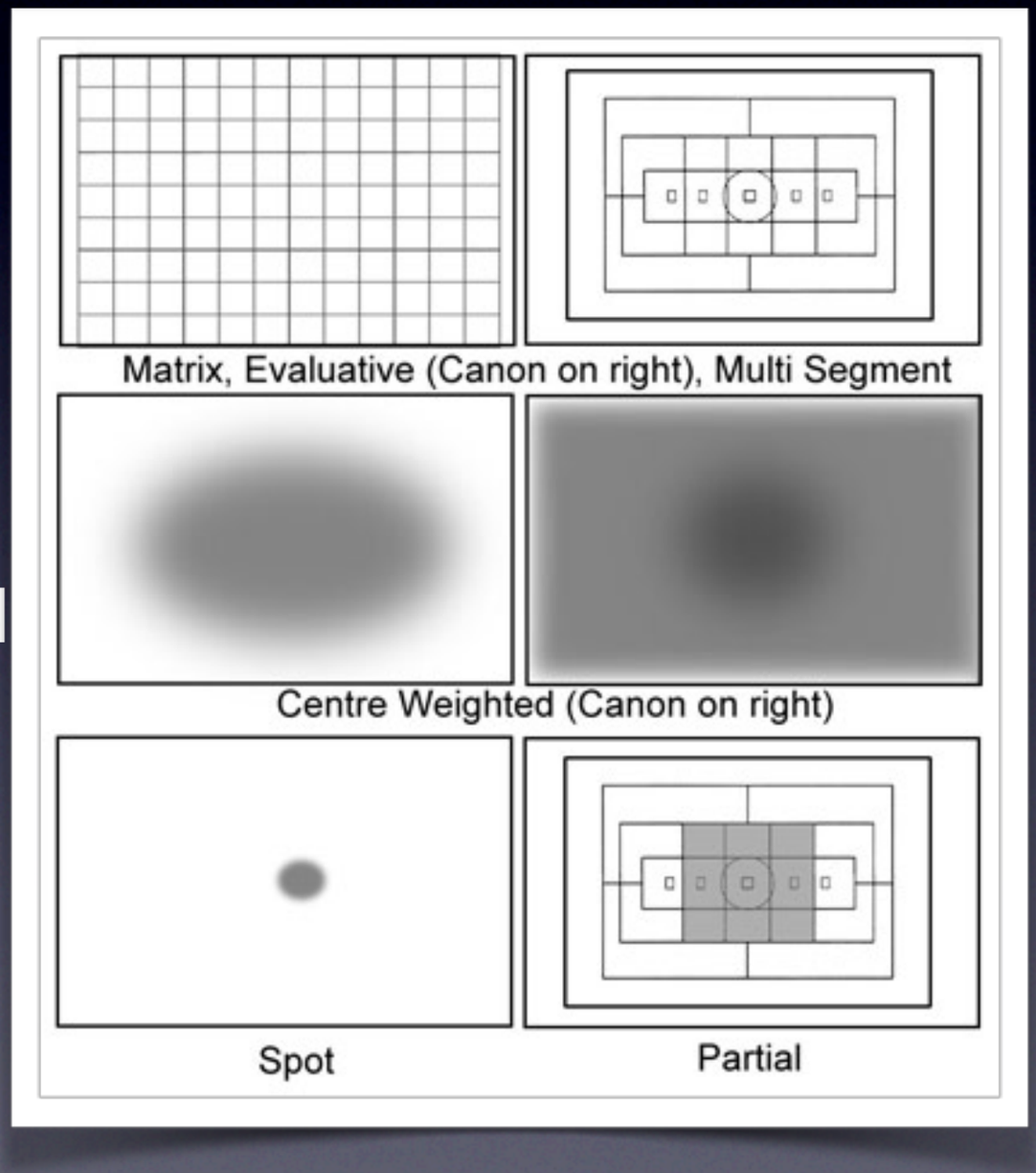


EXPOSURE COMPENSATION

Sample Exposures

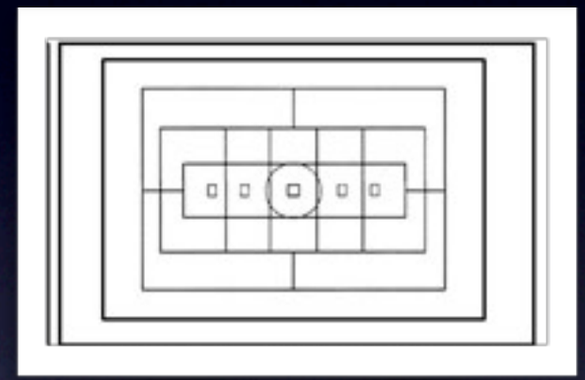
METERING MODES

- Evaluative / Matrix
- Spot or Center Weighted
- Partial or Center Weighted Evaluative



EVALUATIVE / MATRIX METERING

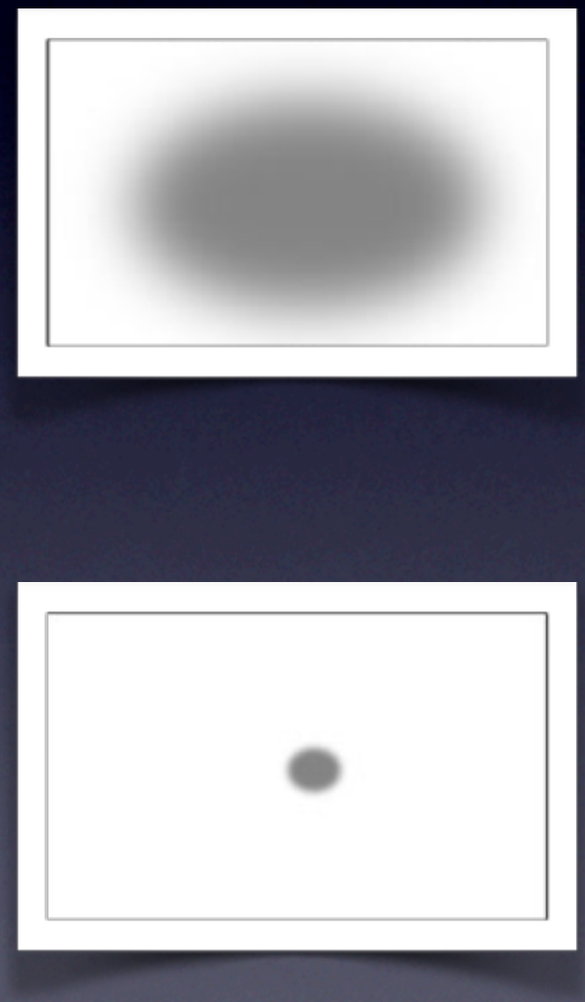
- Essentially, the camera divides the scene into a matrix of metering zones, and takes individual readings for each section. An evaluative meter reading then is diagnosed, and an average metering for the whole scene is given.



- This is a good all around metering mode
- The metering zones varies per camera

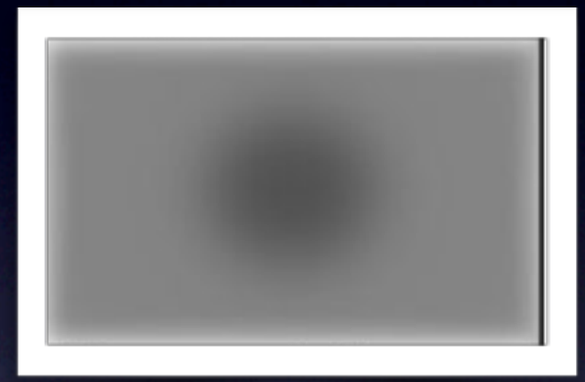
SPOT / CENTER WEIGHTED METERING

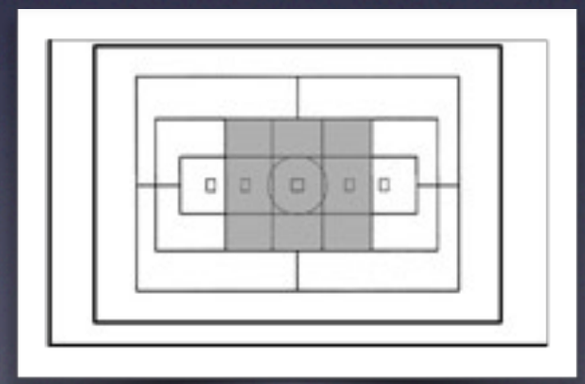
- The Camera bases the exposure based on what's in the center of the frame
- A very predictable mode
- Some cameras offer spot metering based on a point that's selected in the frame
- Best used for backlit subjects



PARTIAL / CENTER WEIGHTED AVERAGE METERING

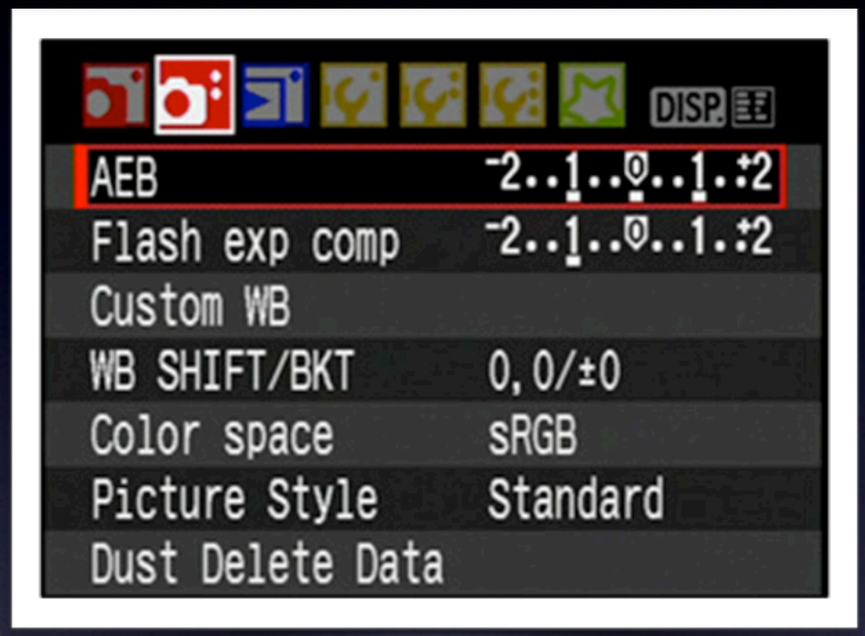
- The Camera gives priority to the center of the frame and averages the exposure with the rest
- Also best used for backlit subjects

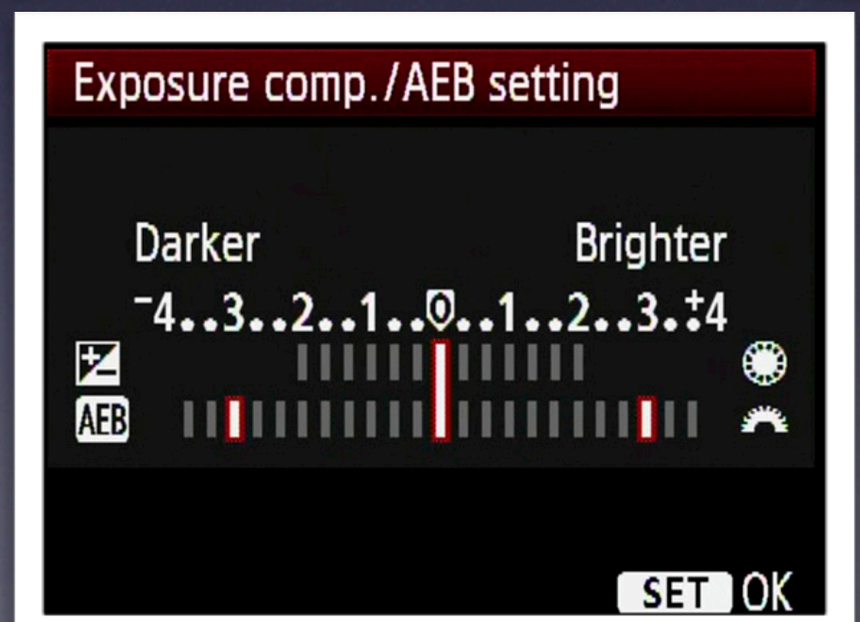




AUTO EXPOSURE BRACKETING

- Used to set up custom bracketing in an automatic or semi-automatic mode
- Available with 3-5 stops
- Adjusts the exposure every three (or five) shots
- Great for HDR





SAMPLE EXPOSURES

5 exposure sequence

WHITE BALANCE

- Measured in Kelvin
- The larger the number, the cooler the temperature
- A setting of 7650K would be for very bright light, 2000K might be for candlelight