

Shooting in Manual Mode



...and the Exposure Triangle

- Two Tech Tip Topic suggestions
- Need to understand Exposure Triangle concepts to shoot in Manual Mode



Why Manual Exposure?

Total control over camera settings

- Independently adjust 3 key exposure variables:
 - Aperture
 - Shutter Speed
 - ISO
- Control light/dark, sharpness, depth of field (DOF)
- Provides better quality/control in challenging light situations
- And it's fun!

Choosing Manual Settings

Consider:

Purpose

Documentary?

Creative?

Foreground/Background

Blurred? In Focus?

Ambient Light

Lots of Light? Low Light?

Stable? Changing?

Subject

Stationary?

Mobile?

Equipment

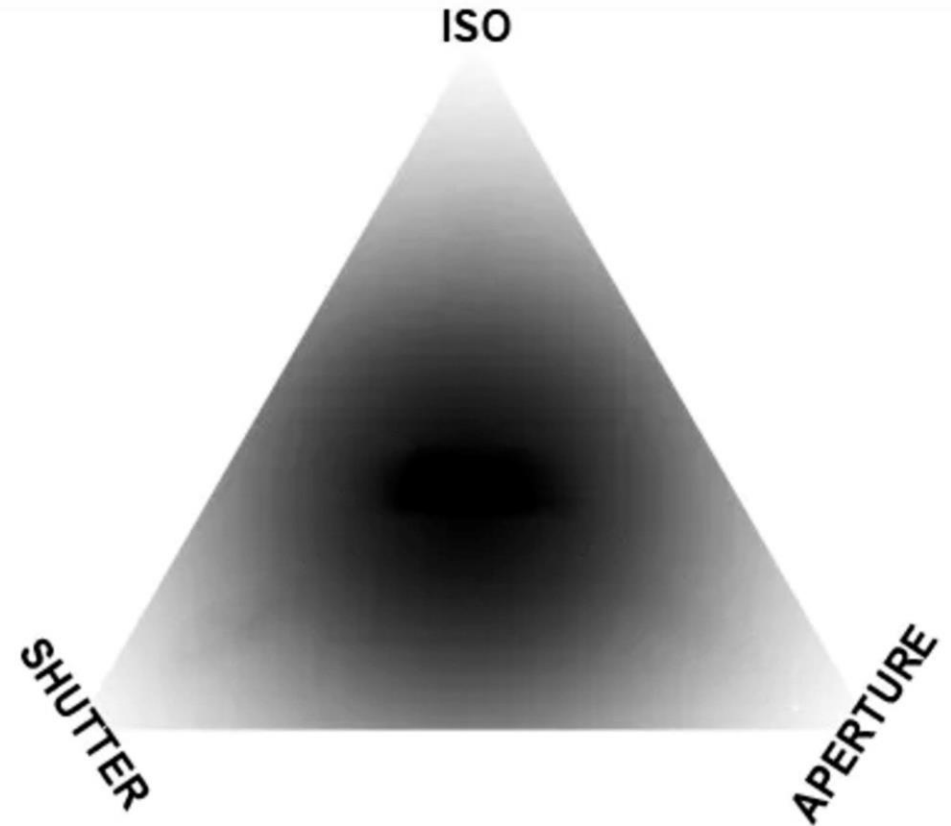
Camera/Lens

Tripod



Exposure Triangle

- Each element contributes to image quality.
- Understanding *how* is key to successfully shooting in Manual Mode



The Exposure Triangle

Exposure Triangle: Aperture

(A, Av)
(v = value)

- Size of the Opening in the lens: "Pupil" - allows light into camera
- Range/variety of sizes
- Measured in "f-stops"
- Common f-stop values: f/1.4, f/2.8, f/5.6, f/8, f/16, f/32
 - Smaller numbers = larger openings (more light)
 - Larger numbers = smaller openings (less light)
- One stop to the next: Double or half the light

Aperture (A, Av)

Controls Depth of Field

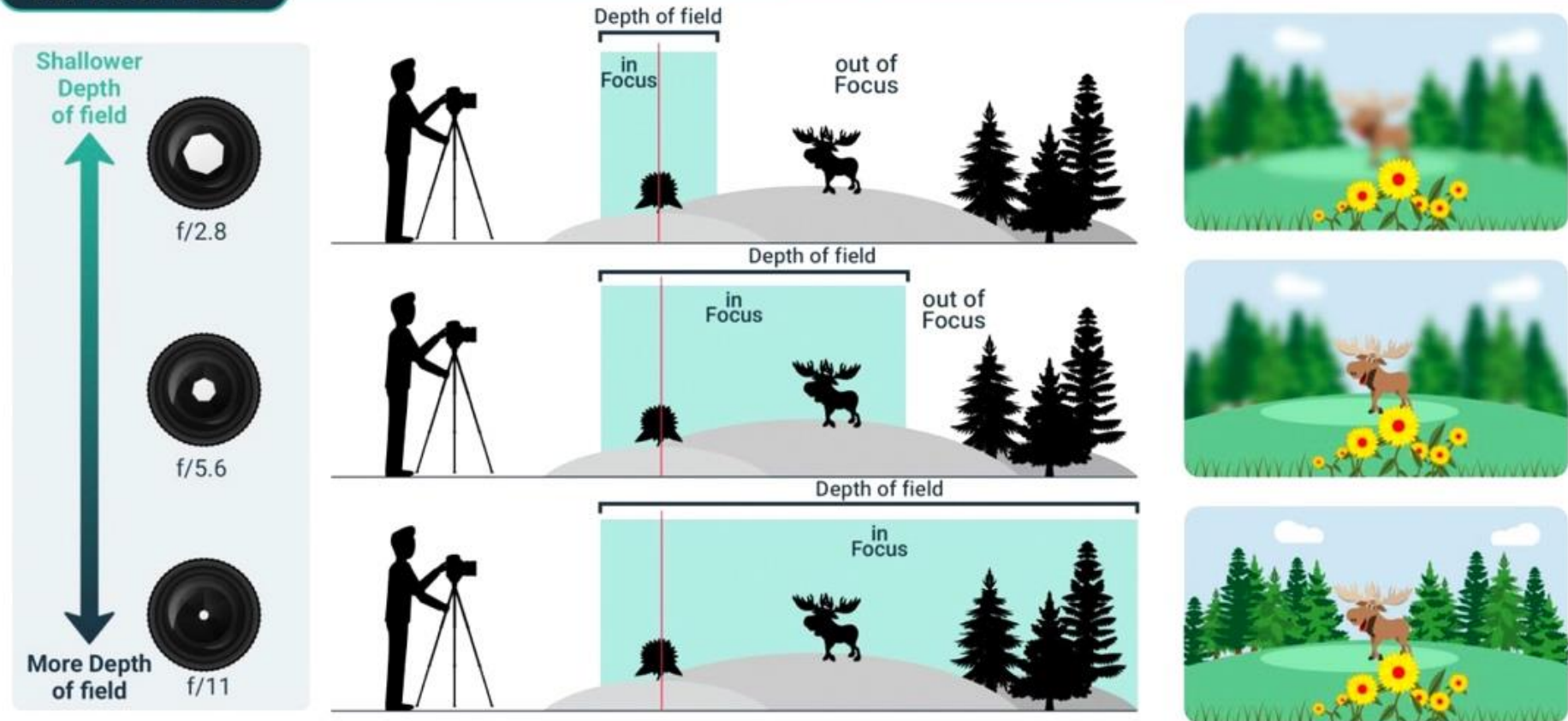
- "Depth of Focus"
- DOF: the distance in front of/behind the subject where objects remain in acceptable focus
- Shallow DOF: sharp subject & blurry background/foreground
- Large/Deep DOF: focus is sharp throughout the depth of the image from foreground to background
- Varies:
 - By chosen f-stop
 - Also affected by distance to subject
 - Lens



APERTURE



DEPTH OF FIELD



Exposure Triangle: Shutter Speed (T, Tv)

- **Time** - How long the shutter stays open
 - Length of time camera's sensors (or film) are exposed to light
 - Allows sensor to collect light for longer/shorter time periods
- Measured in seconds or fractions of a second
- Human eye blink: $1/4$ - $1/6$ second
- Shutter Speeds:10s....1s... $1/10$ s, $1/30$ s, $1/60$ s, $1/125$ s, $1/250$ s, $1/500$ s, $1/1000$, $1/1600$ s, $1/2000$ s..., etc.
- One stop to the next: Double or half the light

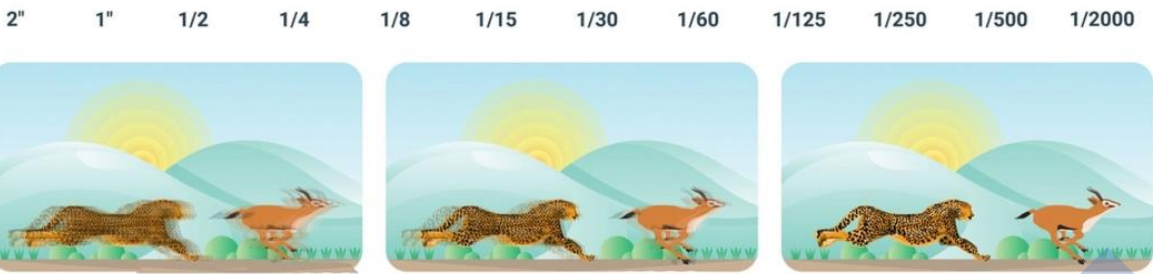
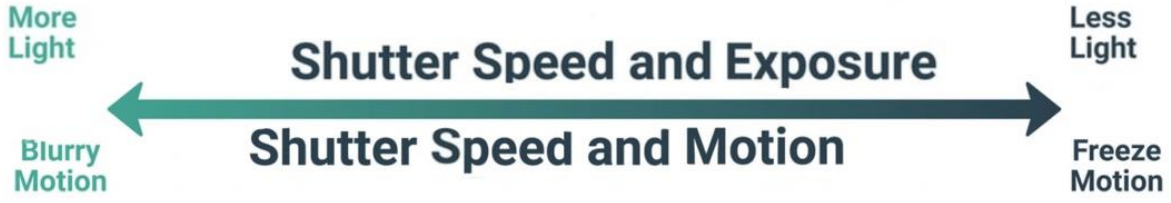
Shutter Speed (T, Tv)

Determines Motion Blur

- Fast Tv
 - Less light compared to slower Tv
 - Freezes action
 - e.g., sports, racing, moving people, animals, windy days,
- Slow Tv
 - Shutter open longer, allows more light
 - Allows motion blur
 - e.g., softens water: rivers, waterfalls



How to Measure Shutter Speed



Exposure Triangle: ISO

Camera's/Film's Sensitivity to Light

- How long it takes the sensors/film to react to light
- Common Camera ISO Values:
 - 100, 200, 400, 800, 1000, 2000, 64,000, 120,000+
 - Lower numbers = slower; more light/time needed for exposure
 - Higher numbers = faster; less light/time needed for same effect
- One stop to the next: Double or half the light



Exposure Triangle: ISO

- No creative influence (DOF, Sharpness/blur)
- Affects technical quality of the image - **Noise:**
 - Camera/sensors struggle to interpret light/absence of light
 - Result: Grainy B&W spots or colorful dots/pixels caused by random signal variation
- Camera sensors have improved over the years, so image quality has improved with newer model cameras ... but at times it is still a problem
- Film users: ISO still a strong consideration
- Use lowest ISO possible to still get the shot you want
 - Depends on conditions
 - Depends on Av & Tv
 - Generally, 100-1000 = "safe"





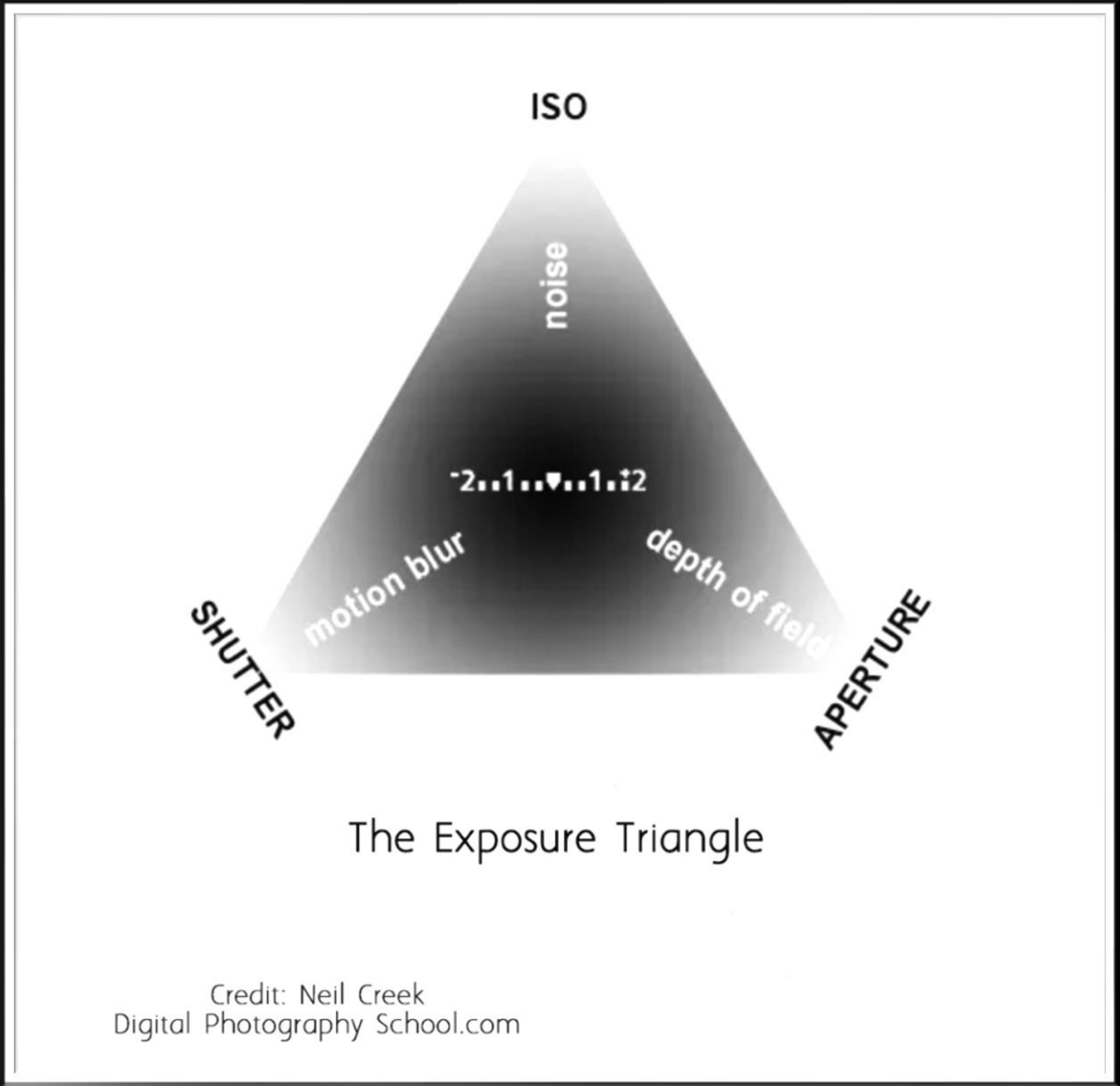
F1,4 F2 F2,8 F4 F5,6 F8 F11 F16 F22 F32



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



ISO 50 ISO 100 ISO 200 ISO 400 ISO 800 ISO 1600 ISO 3200 ISO 6400 ISO 12800 ISO 25600



The Exposure Triangle

Credit: Neil Creek
Digital Photography School.com



Choosing Manual Settings

...Now What?

Like Photoshop, no single correct approach

Choosing Manual Settings:

Considerations

- Shallow or deep DOF?
- Blurry or sharp background?
- Freeze motion or create motion blur?
- Daylight or dark?
- Tripod or handheld camera?

Choosing Manual Settings

When Aperture (DOF) is a Priority

- Camera Mode Dial to [M]
- Set ISO - lowest workable setting
- Set Aperture (A, Av) for desired DOF.
- Adjust Shutter Speed (T, Tv) to allow correct exposure with selected ISO & Av settings
- Check the exposure bar
- Tweak the settings - could be one, two, or all three settings. Start with Shutter Speed, then change ISO if still too under/overexposed. May need to tweak Aperture.

Choosing Manual Settings: Steps

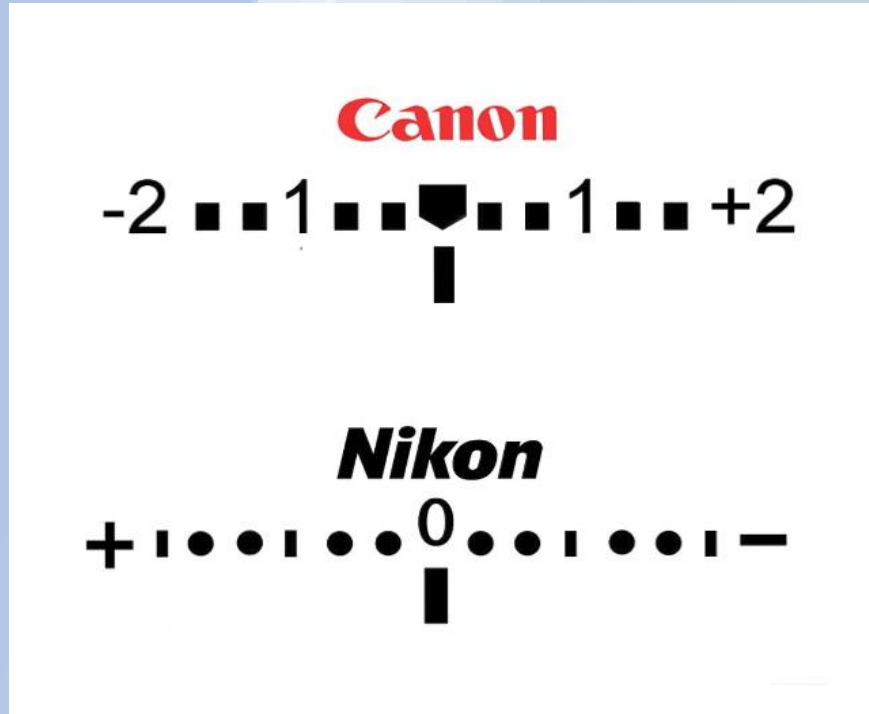
Exposure Bar

- Bottom of viewfinder or back of camera





Choosing Manual Settings: Exposure Bar



- ❑ The camera's "light meter"
- ❑ Guides decision-making
 - Skewed Left: Underexposed
 - Skewed Right: Overexposed
- ❑ If overexposed/underexposed:
Adjust Av, Tv, or ISO to achieve the desired exposure
- ❑ Generally, any change in one setting requires an equal and opposite change in another to achieve the same level of exposure

Choosing Manual Settings:

When Shutter Speed is priority

- Camera Mode Dial to [M]
- Set ISO
- Set Shutter Speed (T, Tv) to control motion
- Adjust Aperture to achieve correct exposure with selected ISO & Tv settings
- Check the exposure bar
- Tweak the settings - could be one, two, or all three settings. Start with Aperture, then change ISO if still too under/overexposed. May need to tweak Shutter Speed.

	Av	Tv	Action	Result
Baseline	f/8	1/200		Correct Exposure
Create Shallow DoF (Blurry Background)	<u>f/2.8</u>	1/200	Increased aperture (Av) 3 stops. (Larger iris - 3 stops more light)	Overexposed
Adjustment:		<u>1/600</u>	b/c Av increased 3 stops, must decrease Tv by 3 stops (decrease time shutter is open).	
Create Deep DoF (Landscapes)	<u>f/16</u>	1/200	Increased Av 2 stops (smaller iris --2 stops, less light)	Underexposed
Adjustment:		<u>1/50</u>	Av is 2 stops higher (less light) So Tv must be 2 stops lower (more time)	
Sharp Image, No Blur (e.g. birds in flight)	f/8	<u>1/800</u>	Tv increased 2 stops (faster shutter, less light)	Underexposed
Adjustment:	<u>f/4</u>		Av must now decrease 2 stops (wider iris, more light).	
Blurred Image (e.g., Panning Shot)	f/8	<u>1/50</u>	Slowed the Tv 4 stops > more light	Overexposed
Adjustment	<u>f/32</u>		Decrease Av 4 stops (less light)	

When Manual Mode Works Well

- In stable light conditions
- For purposeful control over exposure variables
 - Underexpose or overexpose for creative effects
 - Underexpose/overexpose when camera reads incorrectly (e.g., snow, or theater)
- Shooting slow, deliberate photos (e.g., landscapes, projects) with time available to carefully adjust settings

When Manual Mode is Not a Good Idea

- Rapidly/constantly changing light conditions (events, in/outdoors)
- Subjects moving between sun/shade
- Photographing action when Focus is the primary concern & Exposure is a secondary issue
- Fast-paced events: when taking too long to change the setting means you'll miss the shot
- Beginner/comfort level

How to Start Shooting in Manual Mode

- Change your mindset
- Find time & subjects where it doesn't matter if you take a little longer to set up the camera. Use other settings when need to move quickly.
- Easiest way - Start with a tripod & "Still-Life" subjects. Keep ISO low.
- Understand the basics of:
 - Exposure triangle
 - Achieving desired artistic effects using camera settings
- Practice
- Have Fun!