

# Exposure

# Priority

# Modes



APERTURE AND SHUTTER PRIORITY

Presented by Paul Keske

for

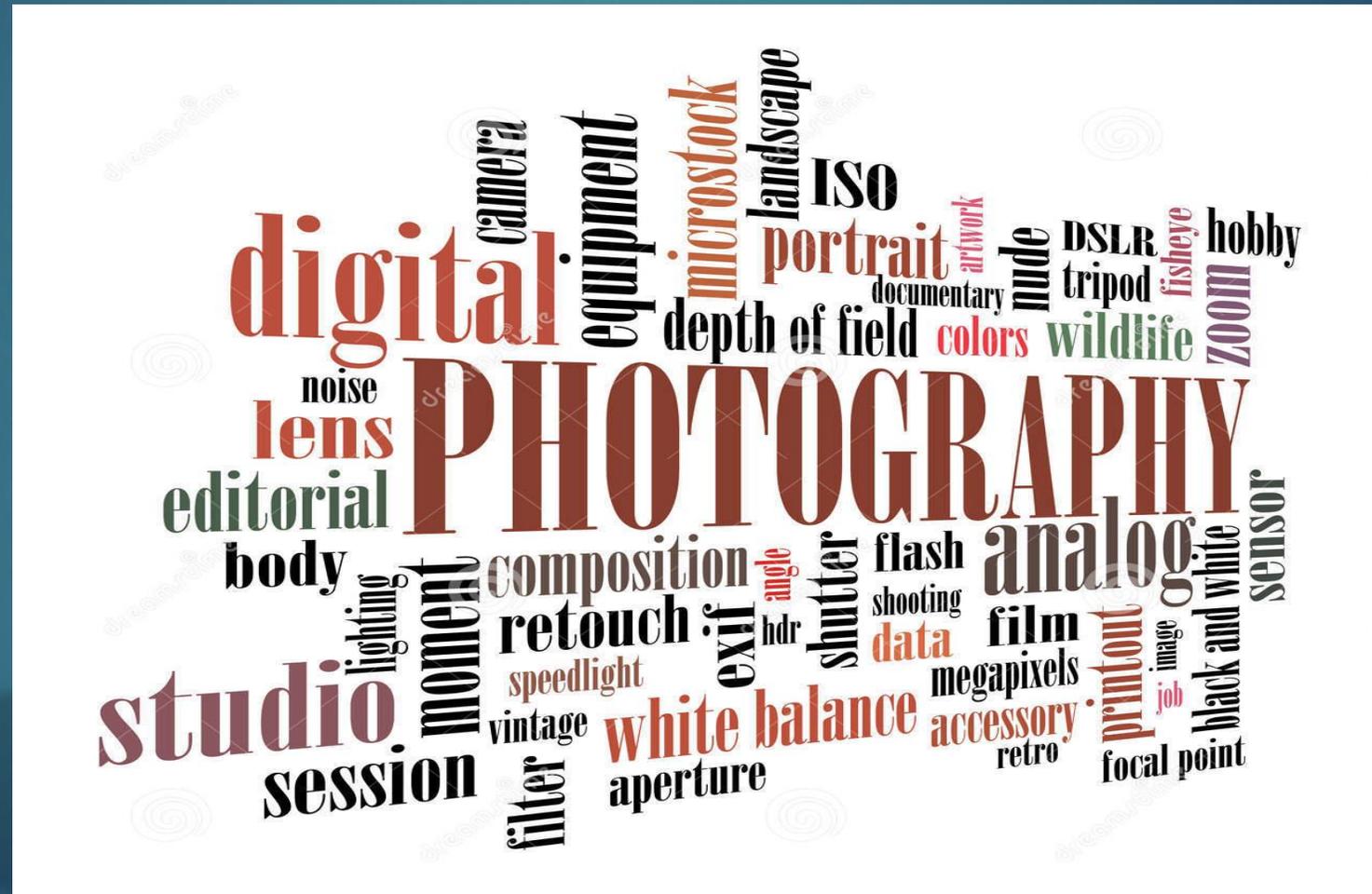
The Wilderness Center  
Nature Photography Club

# Photography Today

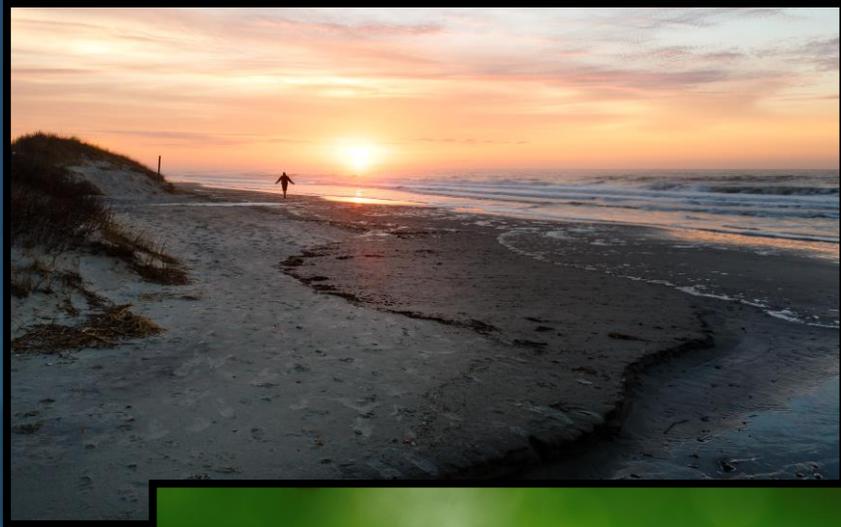
Photography today can be very simple. Camera manufacturers sell lot's of camera's because they have made photography so easy. You can simply grab your camera phone or put your camera in full auto mode and snap away. Little thought. Mostly good exposures. No problem.



So – why take the time and effort to learn what all of those controls do on your camera when the camera can do the heavy lifting?



If you take control of your camera you  
can show the world YOUR vision



# Full Auto limits the creative photographer because...



The diagram illustrates the limitations of Full Auto mode. It features a central camera mode dial with 'Auto' selected and highlighted by a green box. To the left, two boxes show 'Auto' selected for Apertures and Shutter Speeds. To the right, a list of settings is shown: Exposure - Auto, Shutter Speeds - Auto, Apertures - Auto, ISO - Auto, Focus - Auto, Flash - Auto, Menus - Limited, and Manual Options - Disabled. A red dot with the text 'Too many "child safety" locks!' is positioned below the dial.

Auto Apertures  
Auto Shutter Speeds

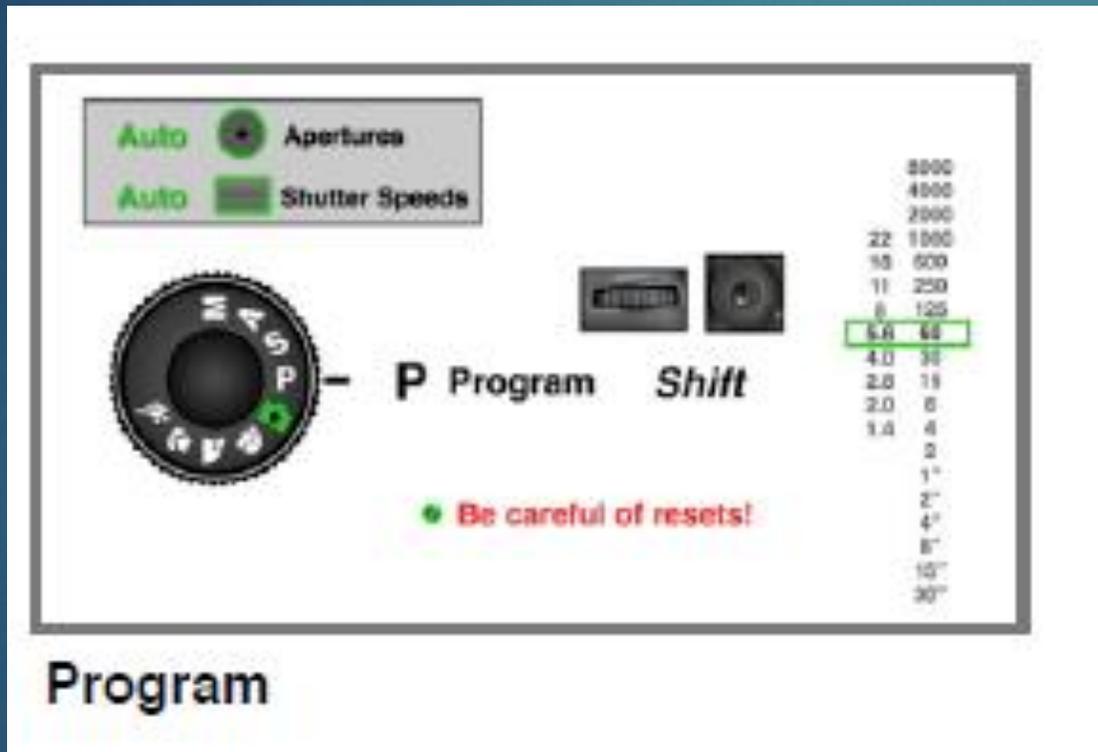
Exposure - Auto  
Shutter Speeds - Auto  
Apertures - Auto  
ISO - Auto  
Focus - Auto  
Flash - Auto  
Menus - Limited  
Manual Options - Disabled

● Too many "child safety" locks!

## Auto Scene Modes

You are extremely limited in the creative aspects of photography when in full Auto because most creative functions are not accessible in Full Auto.

# The Limits of the Program Mode



The Program Mode is a little better, but limits the changes that can be made.

Many cameras will reset to the camera choice defaults immediately following one exposure.

# The Technical Side of Your Camera

When you leave full Auto and Program mode YOU get to make choices for ...

- ▶ Exposure
  - ▶ Aperture, Shutter, ISO
  - ▶ Exposure Mode
  - ▶ Meter Mode
  - ▶ Exposure Compensation
- ▶ White Balance
- ▶ Focus and Focus Mode
- ▶ Drive Mode
- ▶ Image Stabilization



# Today we will explore the Priority Modes...



## Depth of Field

In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. —Wikipedia

APERTURE



f/2.8



FOCUS



DOF



f/5.6



f/11



# Aperture and Shutter Priority

You will choose an Exposure Modes for one of two reasons....

- Technical reasons and Creative reasons

## The Artistic

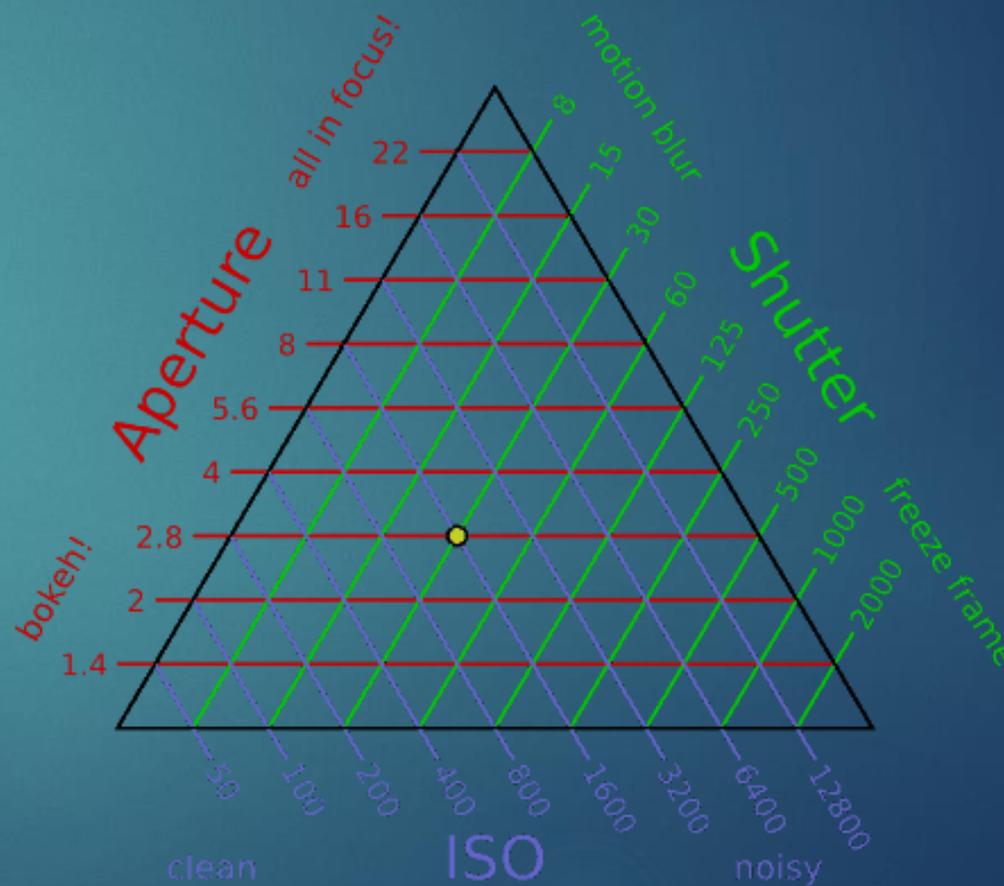
- ▶ **Aperture Priority**
  - ▶ Shallow Depth of Field
  - ▶ Maximum Sharpness
  - ▶ Maximum Depth of Field
- ▶ **Shutter Priority**
  - ▶ To Freeze Motion
  - ▶ To Blur Motion

## The Technical

- ▶ To Let in More Light
- ▶ To Let in Less Light

# To Understand the technical and artistic we must first understand exposure

## The Exposure Triangle



# Camera Settings that affect Exposure

- ▶ **Shutter Speed**
  - ▶ **How Long**



- ▶ Shutter Speed is a function of time. It determines HOW LONG the shutter remains open.
- ▶ Shutter Priority mode lets us change the shutter speed while the camera chooses an appropriate aperture.

# Camera Settings that affect Exposure

## Aperture

### ➤ How Much

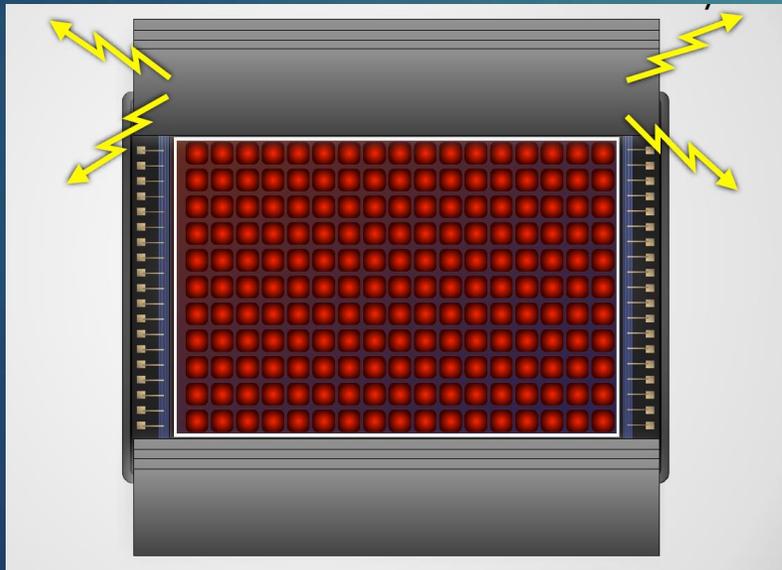


- ▶ Aperture is a QUANTITY VALUE. It determines HOW Much light is let into the camera during exposure.
- ▶ Aperture Priority lets us choose an aperture while the camera will choose an appropriate shutter speed

# Camera Settings that affect Exposure

## ISO

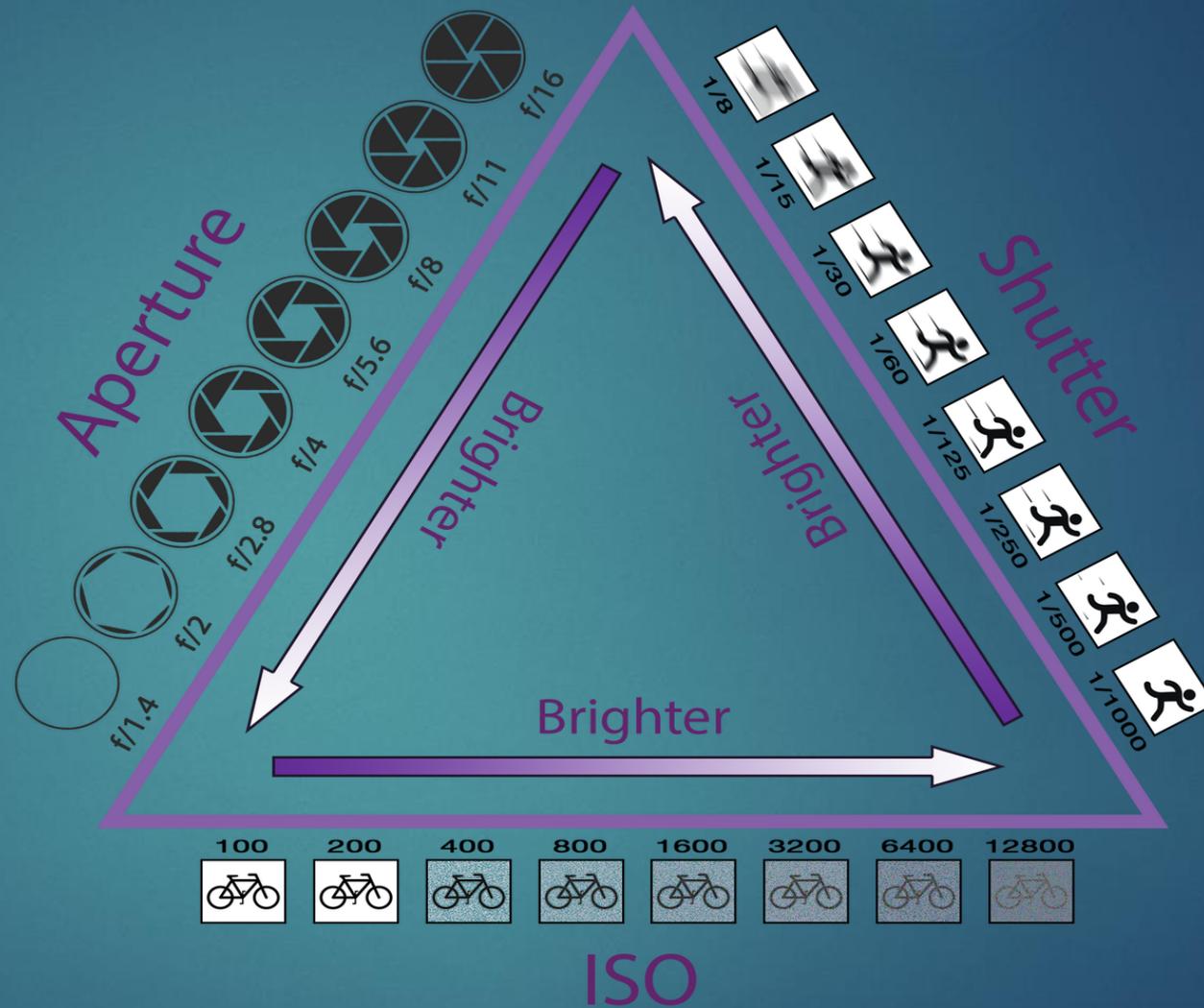
### ▶ How Sensitive



- ▶ ISO determines HOW SENSATIVE your cameras sensor is to light.
- ▶ You can either choose an ISO or let the camera choose the appropriate ISO

# Exposure

If you change one element of exposure you must change at least one of the other two in the opposite direction.





# Aperture and Shutter Priority

# First lets Look at our Cameras



## *Technical*

To let in less light

To let in more light



***Time***

# Changing Your Camera's Aperture...

For Aperture Priority Make sure your mode dial setting is Aperture Priority



... Next - Move the dial to change the Aperture



# Changing your cameras Shutter Speed

First move your mode dial to Shutter Priority...





Depending on which mode you select the dial will change either the aperture or the shutter speed.



# Shutter Priority

First let's examine shutter priority

In shutter priority you select the shutter speed and the camera selects the aperture.

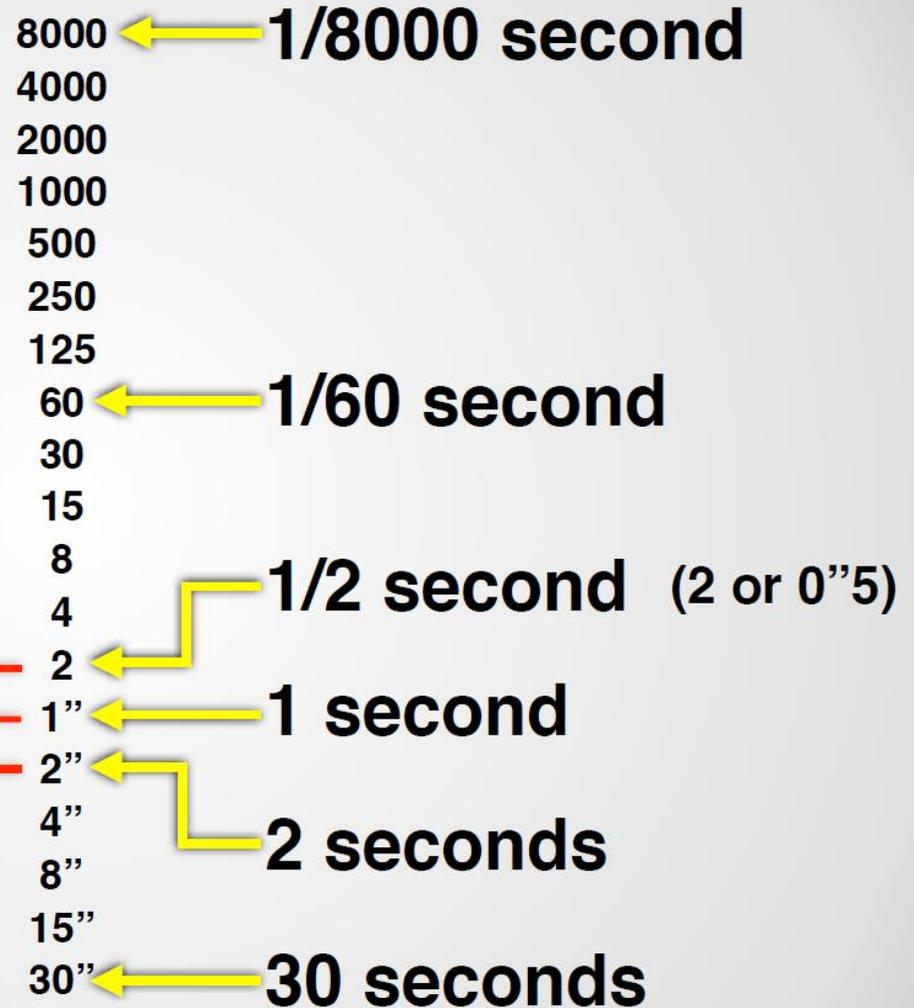


# Shutter Speed

Shutter Speeds  
(Exposure Time)

**Full Stop:**

- To double
- To cut in half



Your camera is capable of displaying shutter speeds in 1/3 stop increments.

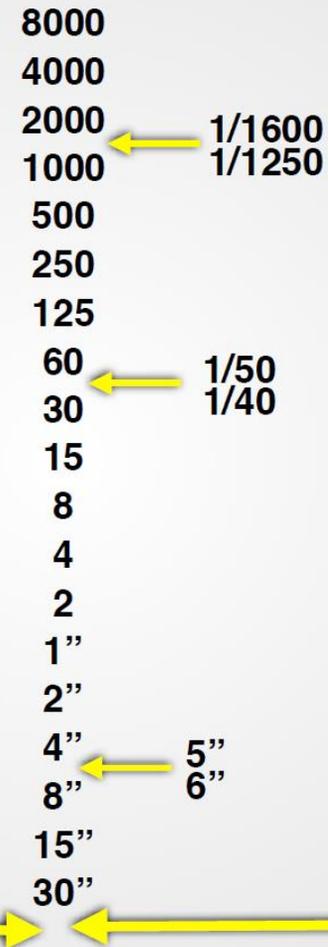
The X-Sync is the maximum shutter speed that will sync with your flash. Typically this is 1/200 sec. Check your camera manual to see what the X-Sync is for your camera.

Many camera models have a Bulb or B setting. This setting will keep the shutter open as long as you depress the shutter button.

## Shutter Speeds

Third Stop ● 1/3 of a Full Stop

**X-Sync**  
Flash synchronization



**Bulb**  
Long Time Exposure

# Camera Blur and Hand Holding

Camera blur occurs when you select a shutter speed that is too slow for you to hand hold the camera without noticeable movement showing in your image as blur. Camera blur can be subtle and can ruin an otherwise good image.

Before image stabilization technology the general rule of thumb for a “safe” shutter speed was 1 over the focal length of the lens.

## Safe Shutter Speeds for Handholding



$$\frac{1}{60}$$

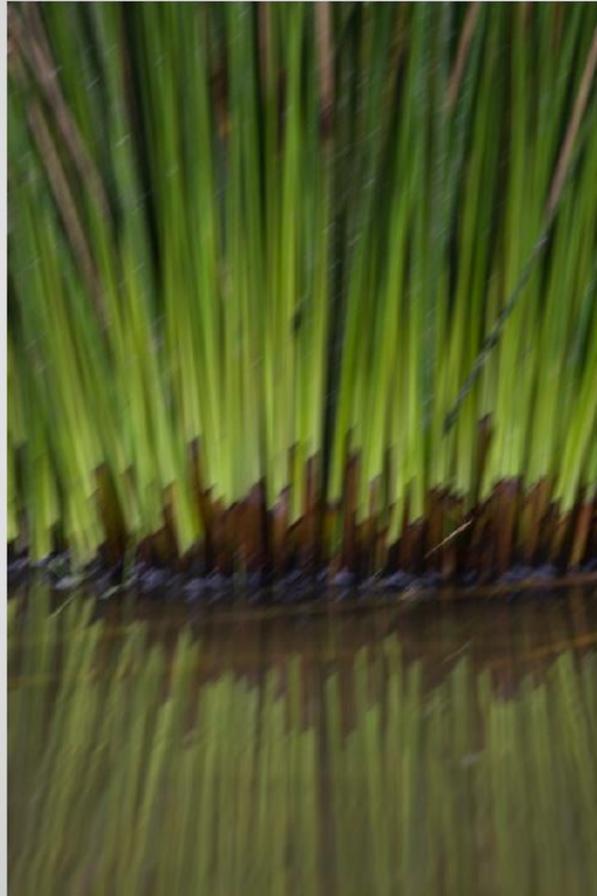
## Handholding Rule of Thumb

<i>Minimum Shutter Speed</i>
$\frac{1}{\text{Focal Length}}$

# Image Stabilization

Image Stabilization allows hand holding at slower shutter speeds.

## Image Stabilization & Vibration Reduction



**200mm**  
**1/60**

**With  
IS/VR**

**200mm**  
**1/60**



# When to use a Tripod

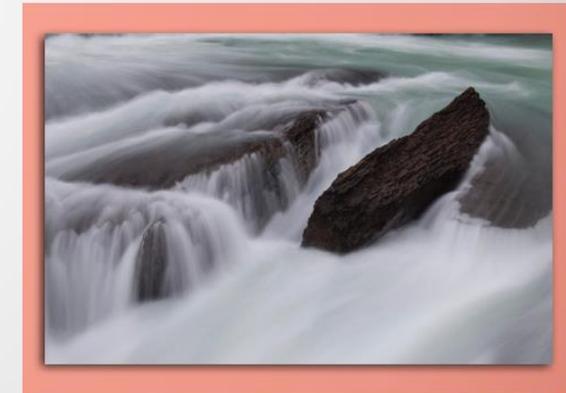
## Shutter Speeds

8000
4000
2000
1000
500
250
125
60
30
15
8
4
2
1"
2"
4"
8"
15"
30"

Handheld

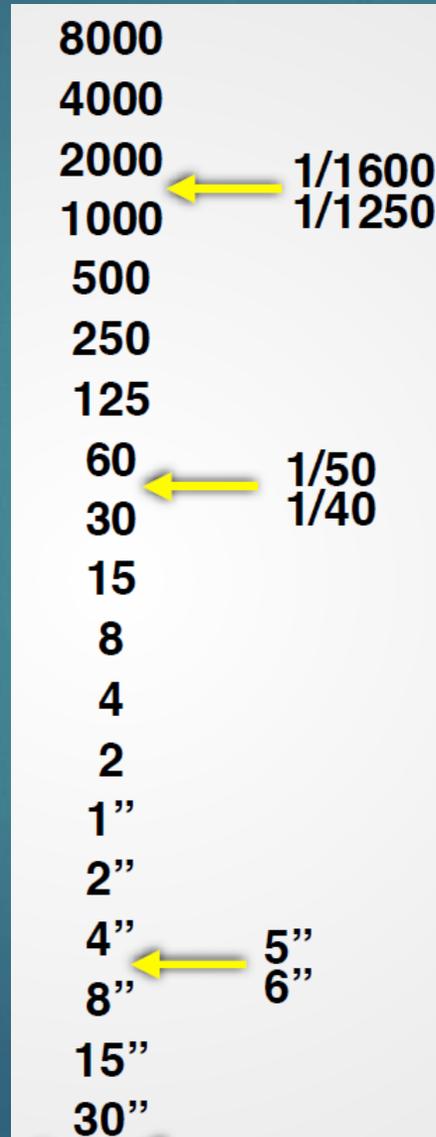


Tripod



# Limitations of Shutter Priority

In Shutter Priority there is a possibility that if you choose one of the faster shutter speed, the camera will not be able to match it to an aperture. Once the Aperture reaches it's Maximum setting, the camera will begin to underexpose your images.



Aperture	
	22
	16
	11
	8
	5.6
	4.0
	2.8
	2.0
	1.4

# Shutter Speed – The Creative Side

## *Aesthetics*

To freeze motion ↗

To blur motion ↘



# With Fast Shutter Speeds You Can Freeze Motion



# Fast Shutter Speeds Freeze Motion

Fast Shutter Speeds stop motion.

Typically a shutter speed must be at least 1/250 second to be considered fast.

- 8000 second – Freeze Water Drops
- 4000 Second – Humming Bird in Flight
- 2000 Second - Birds in Flight/Wild Animals
- 1000 Second – Sports Photography
- 500 Second - Humans Running and Birds with some wing blur
- 250 Second – Activity with some blur

8000 ← **1/8000 second**  
4000  
2000  
1000  
500  
250



# Slow Shutter Speeds Blur Motion



# Slow Shutter Speeds

Slow shutter speeds blur motion. The slower the shutter speed the more pronounced the blur. They also allow for greater depth of field in landscape photography.

- 1/15 to 1/8 second – Good for panning shots and showing blur in moving humans
- 1 to 4 seconds – Good for blurring water shots
- 4 to 30 seconds – Good for twilight to full night scenes, light painting, surreal water landscapes
- 30 seconds plus – Good for capturing star trails and other night time sky events

**15**

**8**

**4**

**2**

**1"**

**2"**

**4"**

**8"**

**15"**

**30"**



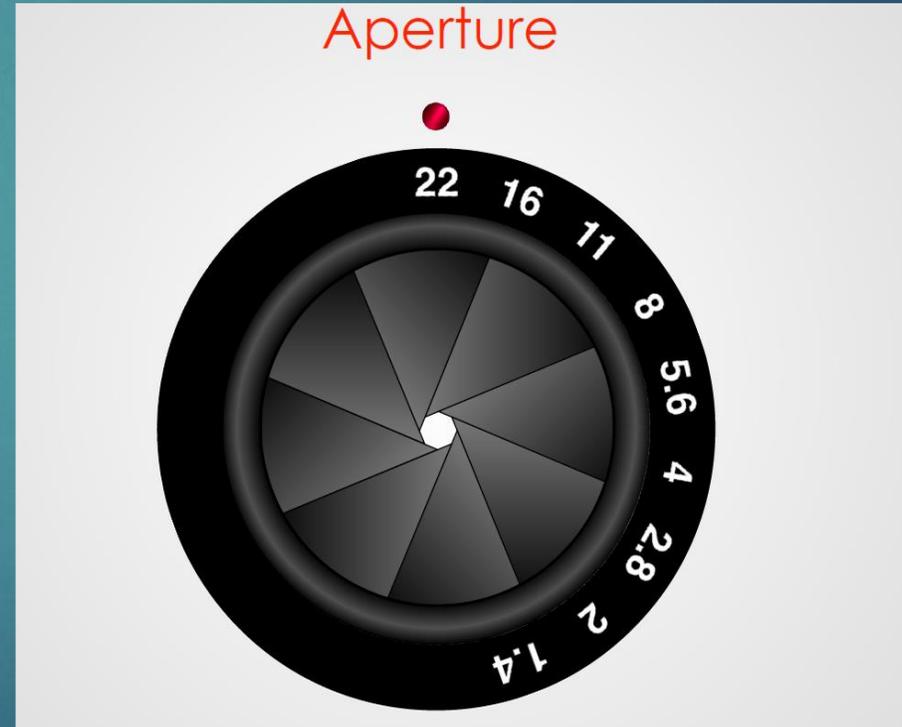
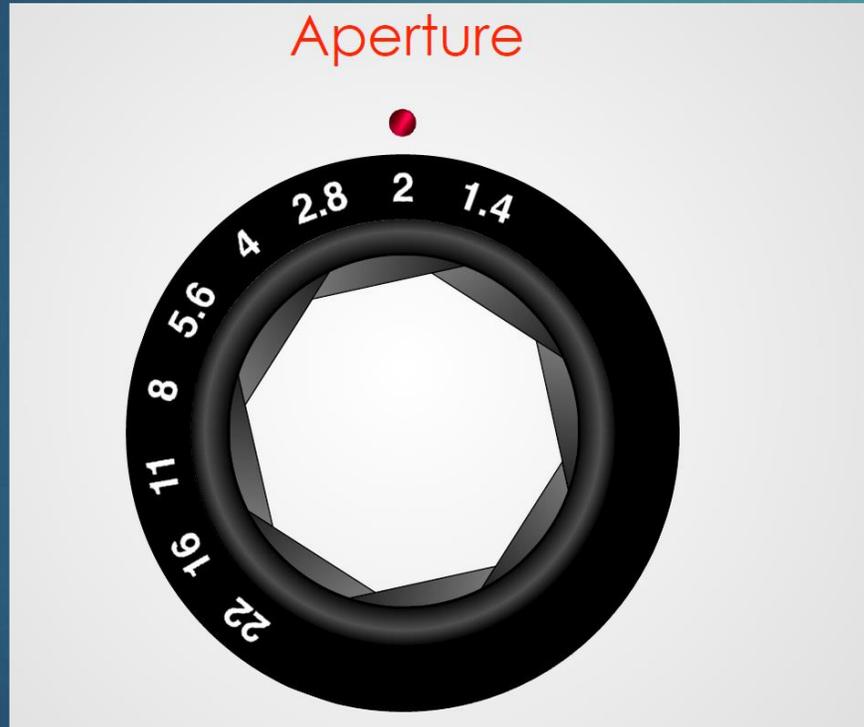
# Now let's Explore Aperture Priority



**APERTURE PRIORITY MODE**

# The Aperture

The Aperture is the opening in the lens that let's in light.



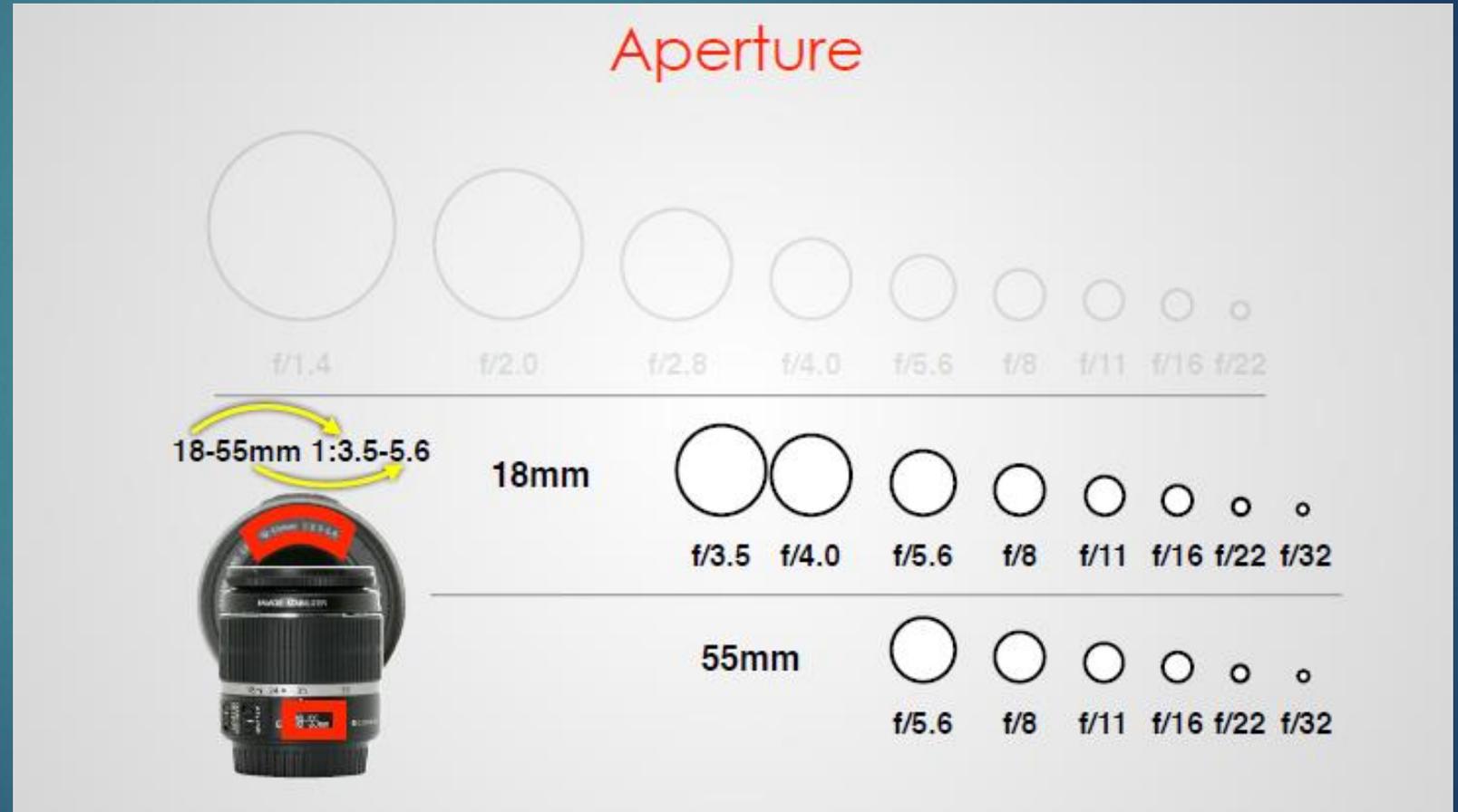
# Maximum Aperture

The largest aperture on a lens is known as the **Maximum Aperture**. This number is typically marked on the lens body.



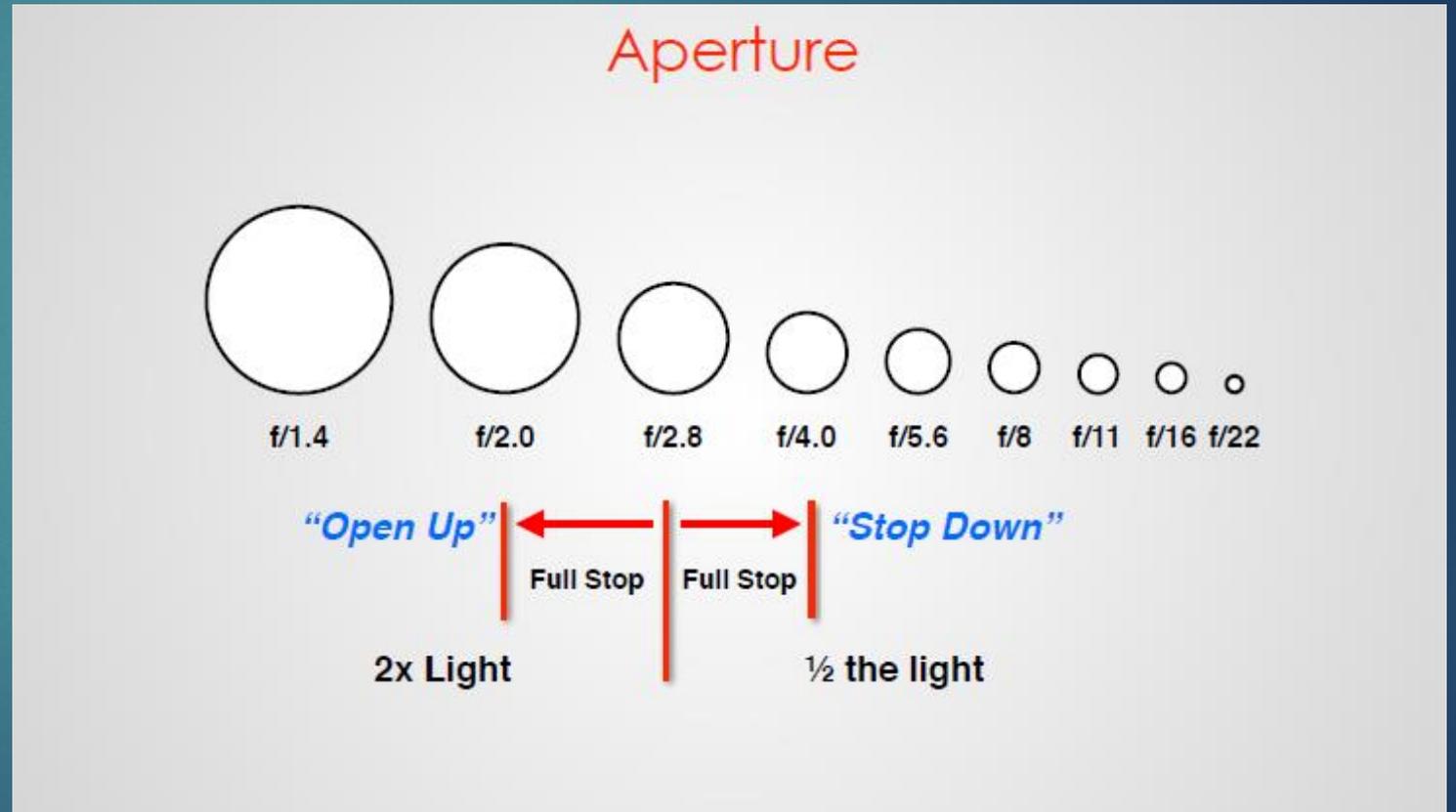
# Zoom Lenses

On some zoom lenses the maximum aperture varies depending on what focal length the lens is zoomed. Typically the smaller number is at the found at the widest focal length and the larger number is at the longest focal length.



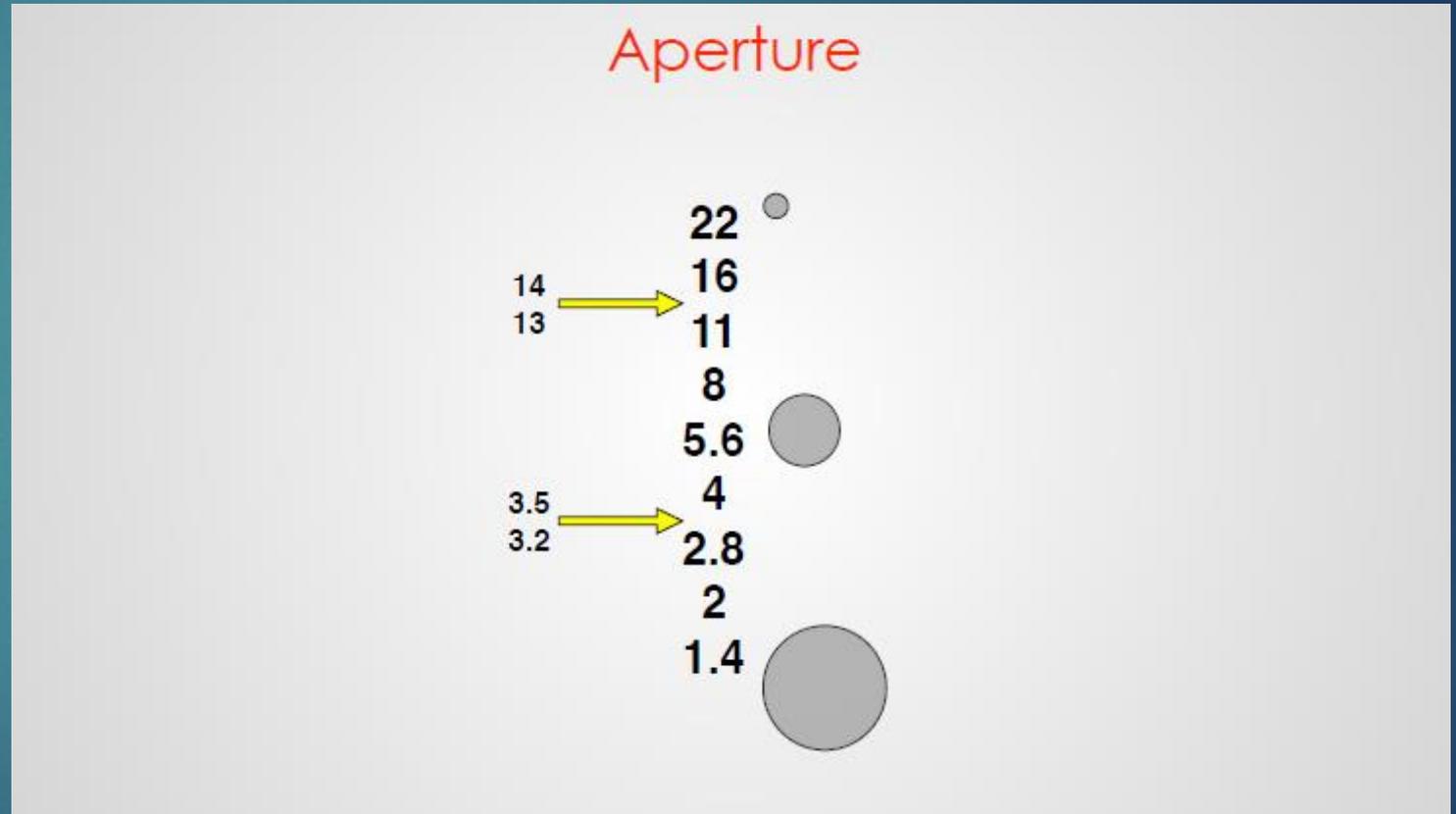
# The Aperture Controls “How Much” light reaches the sensor

These apertures represent the common “full stop” apertures. As you close down one full number i.e., from f/1.4 to f/2.0 you cut the amount of light entering the lens in half. Conversely when you open up one full number i.e., from f/2.8 to f/2.0 you double the amount of light entering the lens.



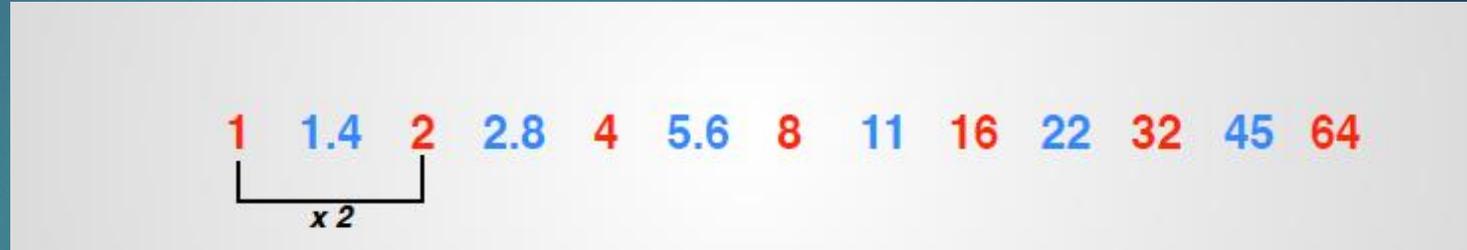
# Partial Aperture Settings

Many camera's allow you to change your aperture in 1/3 stop increments.



# Full range of Apertures

This represents the full range of apertures. Most lenses for DSLR camera's fall between f/1.4 and f/32. Red numbers represent full stops from red to red. The blue numbers represent full stops from blue to blue.



# The Creative Side of Aperture

- ▶ On the Creative Side Aperture directly affects...
- ▶ Maximum Depth of Field
- ▶ Maximum Sharpness
- ▶ Shallow Depth of Field



# The Creative

**Aperture Priority**

Aperture: 22, 16, 11, 8, 5.6, 4.0, 2.8, 2.0, 1.4

Shutter Speed: 8000, 4000, 2000, 1000, 500, 250, 125, 60, 30, 15, 8, 4, 2, 1", 2", 4", 8", 15", 30"

Maximize depth of field  
Blur Motion

Max sharpness

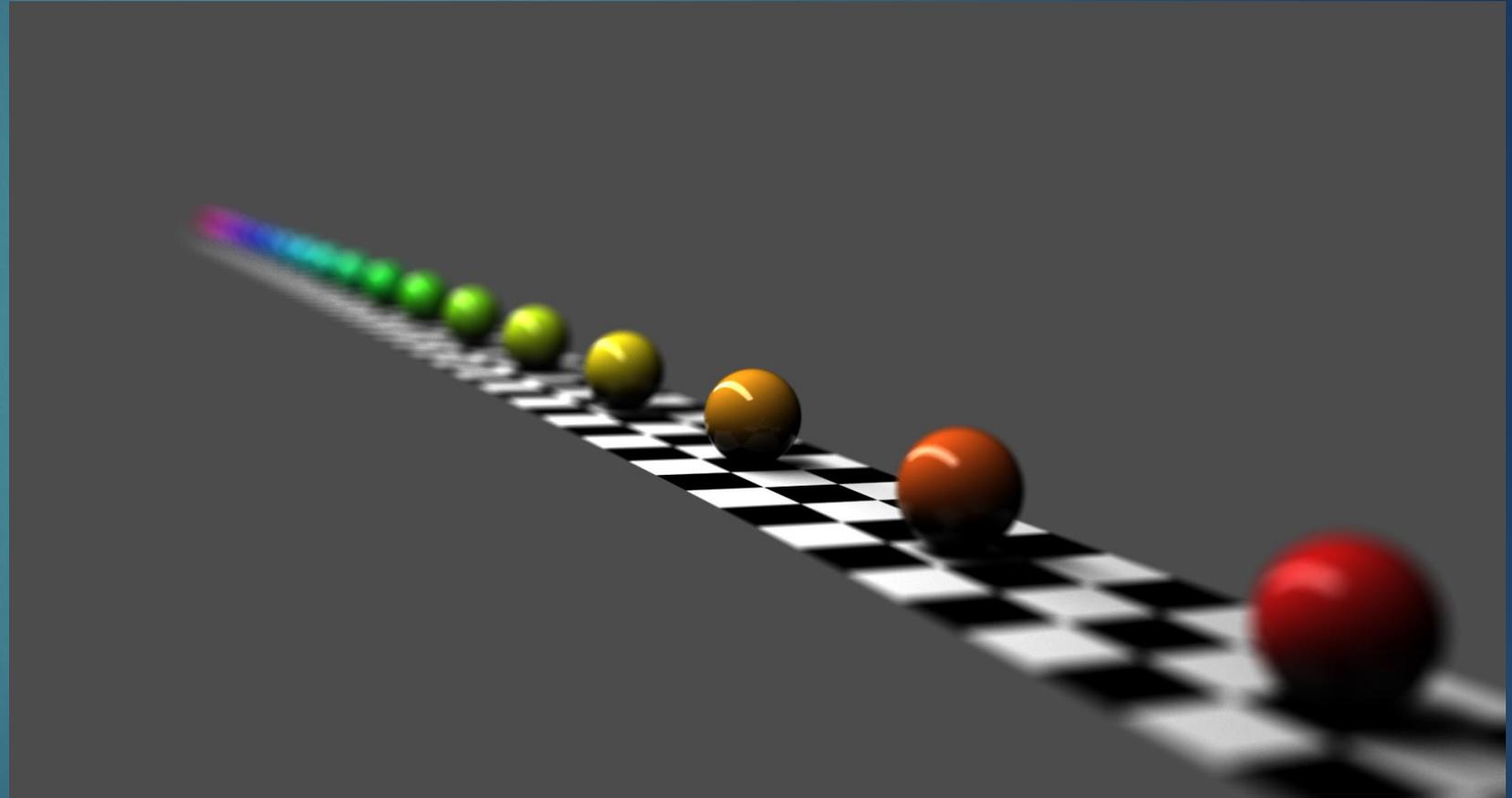
Shallow depth of field  
Freeze Motion

Aperture 5.6 60 Shutter Speed

Aperture	Shutter Speed
22	8000
16	4000
11	2000
8	1000
5.6	500
4.0	250
2.8	125
2.0	60
1.4	30

# Depth of Field

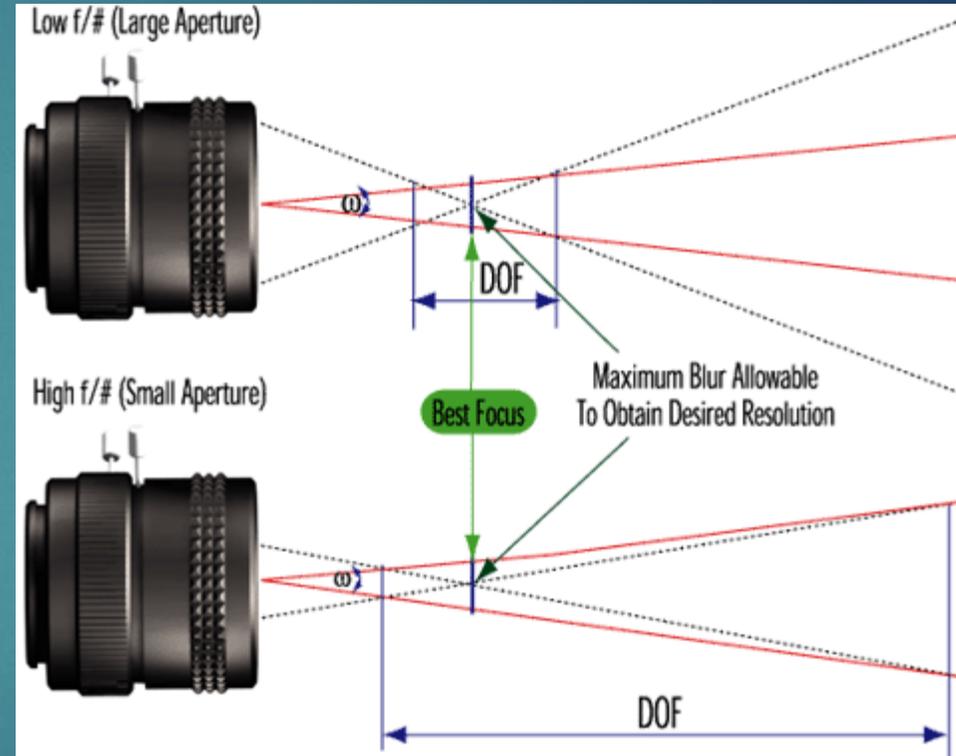
Depth of field is the area of the image that is seen in sharp focus.



# What affects Depth of Field?

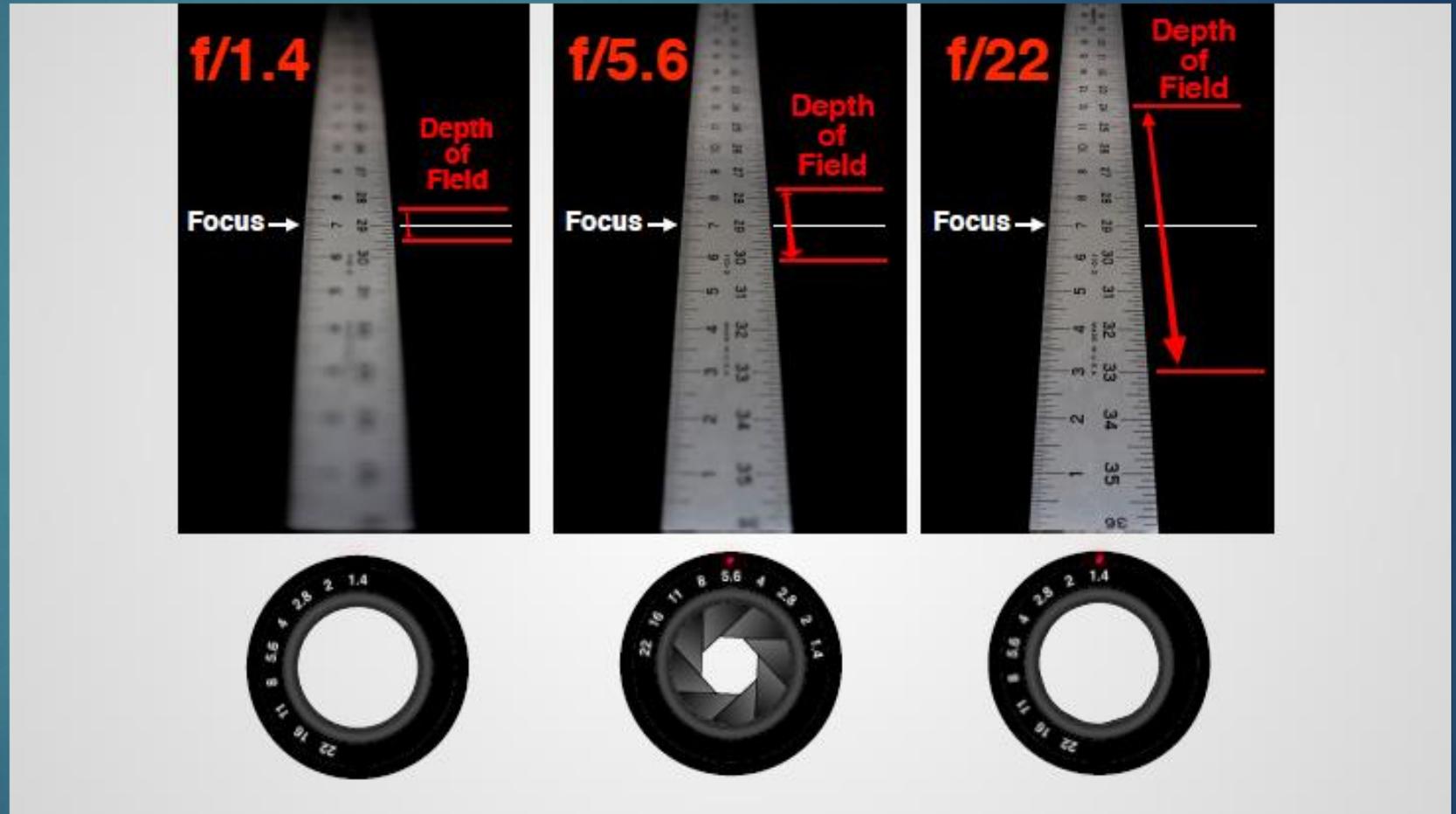
While aperture is the first thing that photographers think of when controlling depth of field there are actually three factors that affect depth in your photograph.

- ▶ The Aperture
- ▶ The Focal Length of the Lens
- ▶ The Shooting Distance

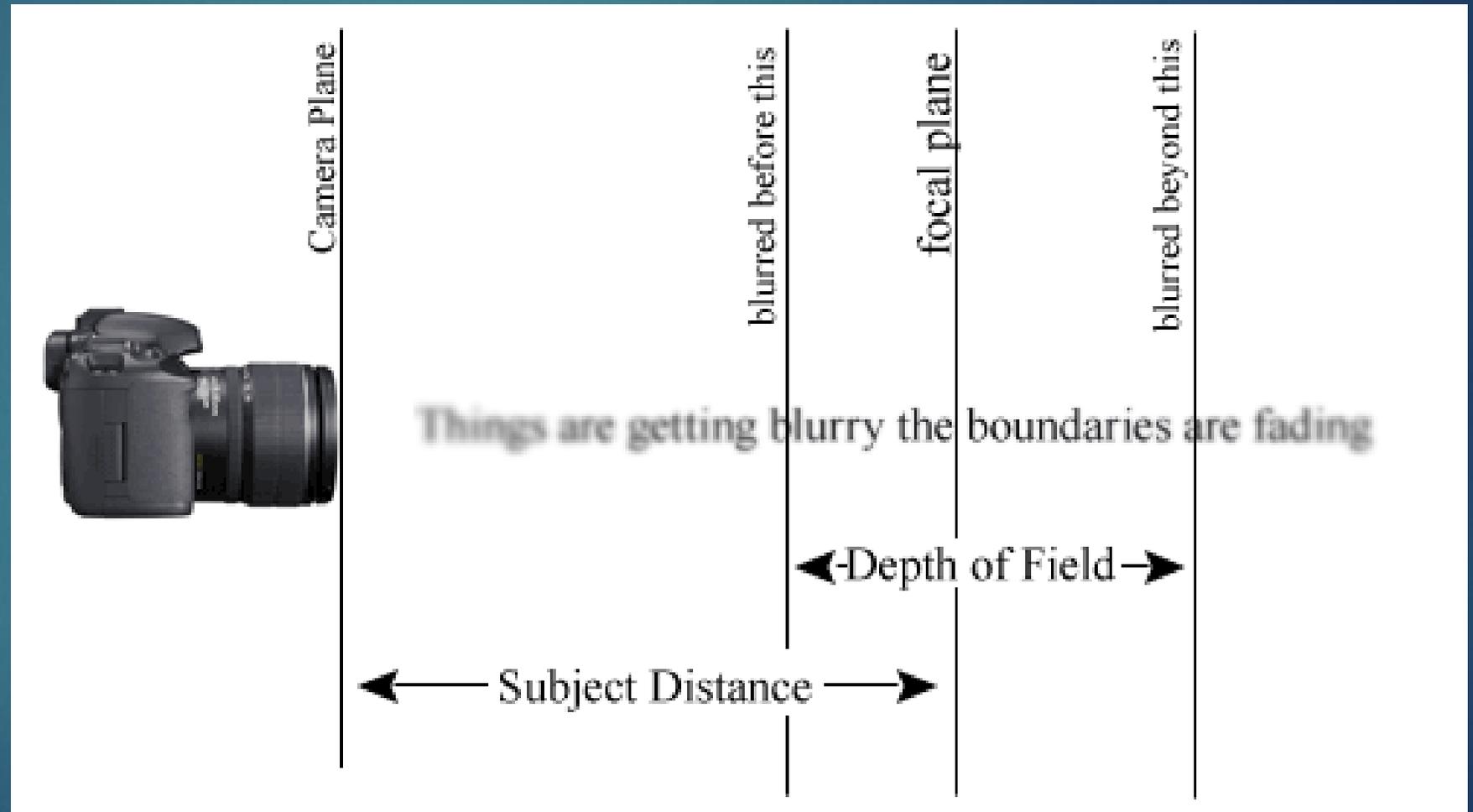


# The Aperture and DOF

Depth of Field (DOF) is controlled primarily by the aperture that you select. When the lens is wide open you have shallow DOF. When the lens is stopped down to f/16 or f/22 you have greater depth of field. The image on the right demonstrates this principle.



# Depth of Field



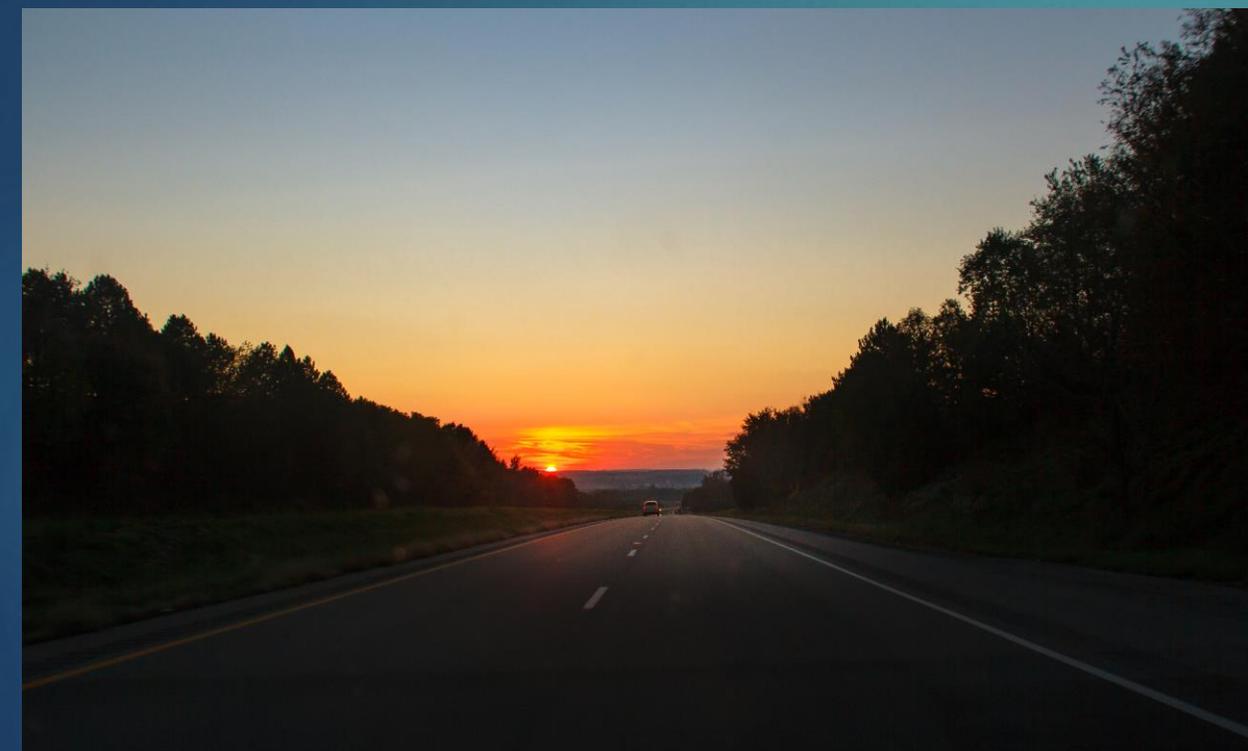
Maximum DOF  
can be achieved  
by using small  
apertures such as  
f/16, f/18, f/22,  
f/32



Aperture

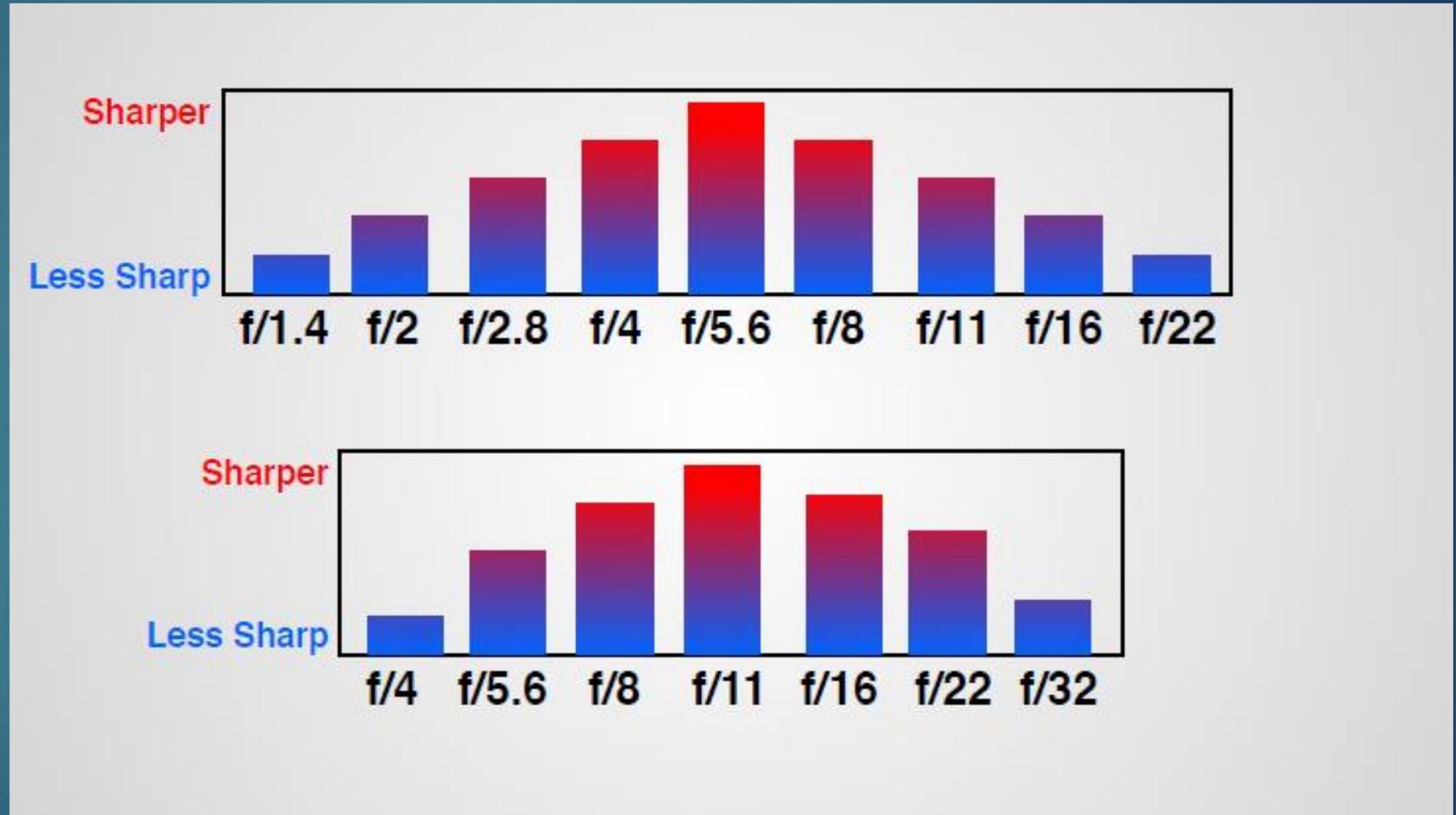
- 22
- 16
- 11
- 8
- 5.6
- 4.0
- 2.8
- 2.0
- 1.4





# Maximum Sharpness

The middle apertures on a lens provide the sharpest images. Usually the middle aperture of a lens provides the maximum sharpness. In this table f/5.6 would provide the maximum sharpness for the lens on the top and f/11 would provide maximum sharpness for the lens on the bottom.



# Maximum Sharpness

In this subject which is relatively flat in spite of the fact that it is a building, using the middle aperture of  $f/5.6$  provides maximum sharpness to help bring out building details

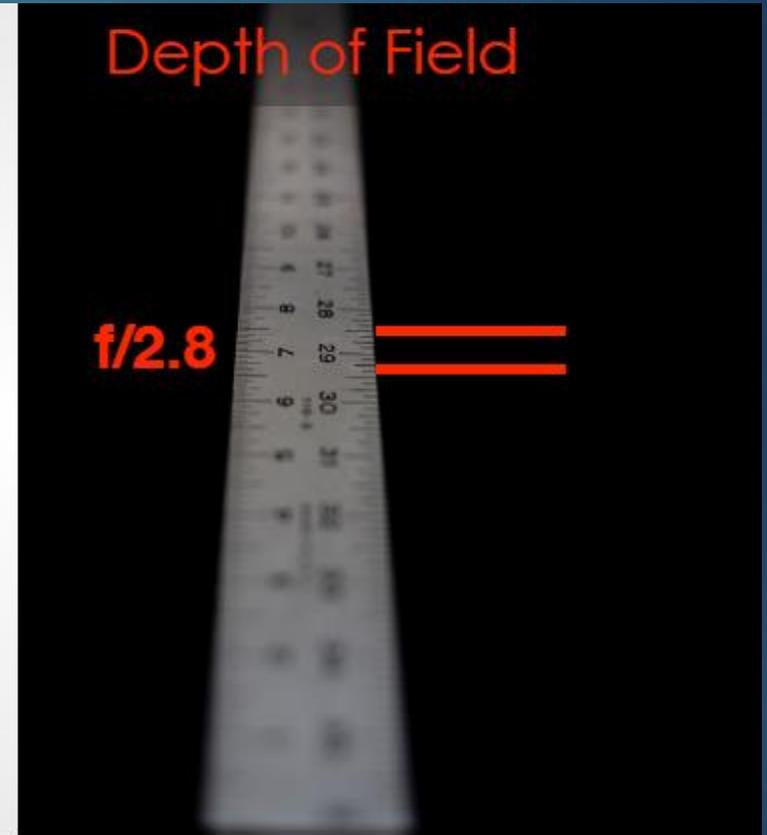


# Maximum Sharpness

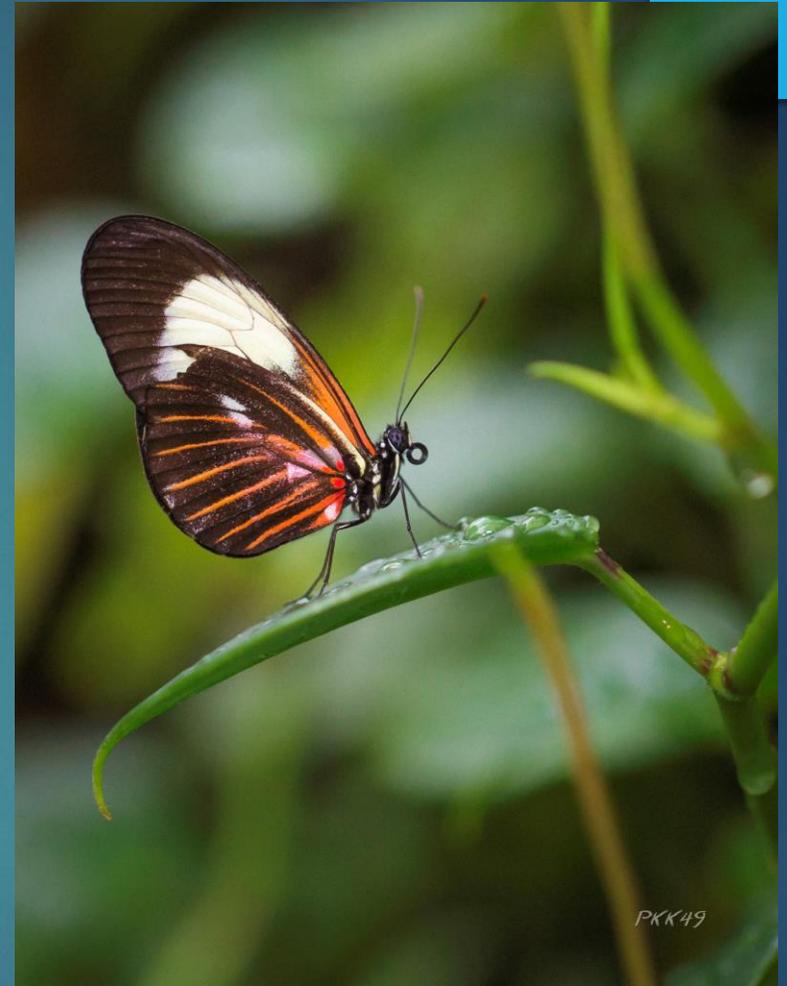


# Shallow DOF

Using wide apertures such as  $f/1.2$ ,  $f/1.4$ ,  $f/2.8$  provide a very shallow DOF allowing backgrounds to go out of focus and drawing attention to the subject. These are very good apertures for portraits, but care must be taken to keep the subjects eyes in focus.



# Shallow DOF



# Aperture Priority Advantage

Unlike Shutter Priority, the camera will always be able to choose an appropriate shutter speed for whatever aperture you choose.

## Aperture

22  
16  
11  
8  
5.6  
4.0  
2.8  
2.0  
1.4

8000  
4000  
2000 ← 1/1600  
1000 ← 1/1250  
500  
250  
125  
60 ← 1/50  
30 ← 1/40  
15  
8  
4  
2  
1"  
2"  
4" ← 5"  
8" ← 6"  
15"  
30"

# A Quick Word about Limitations

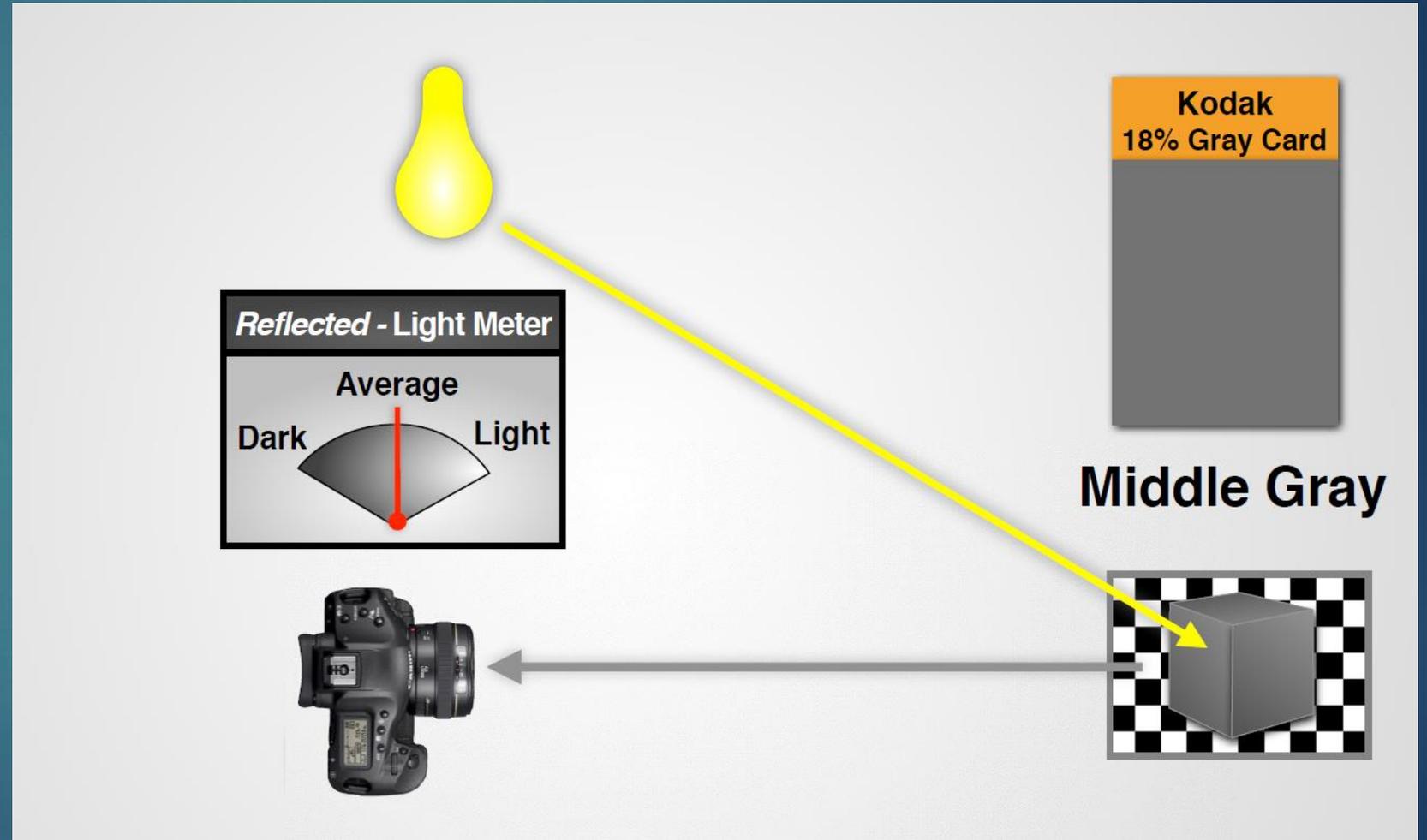


When the camera makes its choice of aperture or shutter speed, it is based on how your meter reads the scene.

High contrast scenes such as shooting in snow or shooting a overly dark subject will often fool the camera's meter.

# How Your Camera Determines Exposure

Your camera uses a Reflected-Light Meter to measure the light falling on your subject. The light reflecting from the subject is what is measured, not the light source. The camera uses 18% gray as the basis of determining what it believes is a proper exposure and attempts to adjust the camera's Aperture, Shutter Speed and ISO to balance the exposure.



# When the Camera gets it Wrong - Exposure Compensation

Sometimes you need to override the camera's choice for exposure. This is called exposure compensation.



Questions...

