

# Putting It All Together

ISO – EXPOSURE – MANUAL MODE



# Last Month – The Priority Modes

**Shutter Priority**  
Time Value

Legend:  
Auto (Green circle) Apertures  
Manual (Red square) Shutter Speeds

- 18 Shutter speeds
- 8 Apertures
- 10 Unusable settings

5000
4000
2000
1000
500
250
125
22
60
16
30
11
15
8
8
5.0
4
4.0
3.8
1"
2.0
2"
1.4
4"
8"
16"
30"

**Aperture Priority**

Legend:  
Auto (Red circle) Apertures  
Auto (Green square) Shutter Speeds

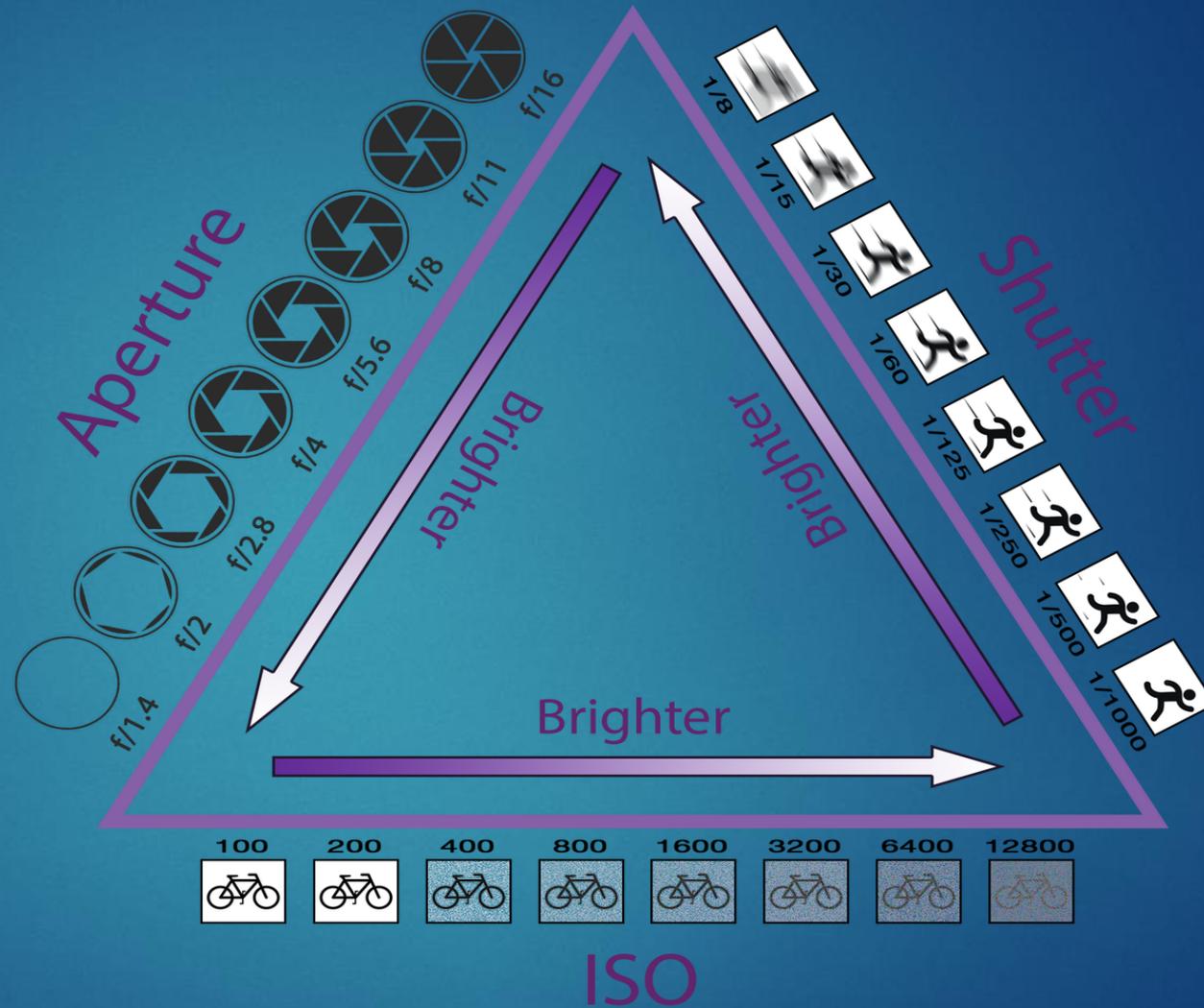
- Maximize depth of field (at 22)
- Blur motion (at 11)
- Shallow depth of field (at 2.8)
- Freeze motion (at 1.4)

22
16
11
8
5.6
4
2.8
2
1.4

Last month we talked about Shutter Speed and Shutter Priority  
And Aperture and Aperture Priority Modes

# 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

You 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

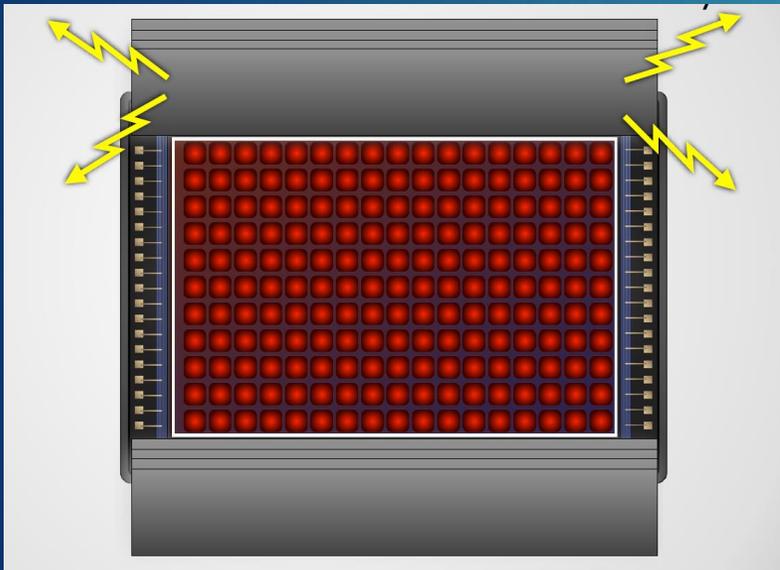
## The Technical

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

# This Month We Start with a Deeper Dive Into ISO and the Sensor

## ISO

### ▶ How Sensitive



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



ISO

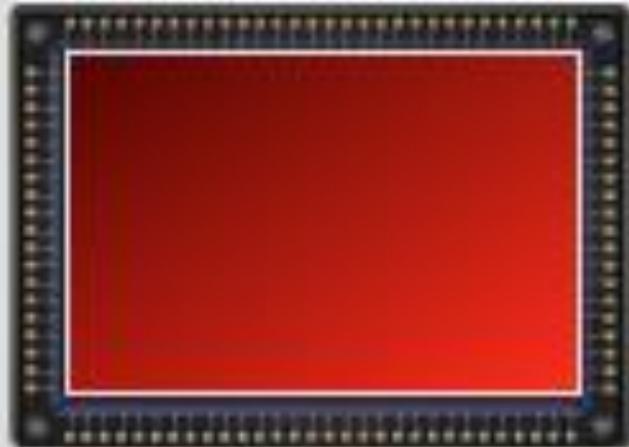
THE TECHNICAL



# ISO – Controls the sensitivity of the image sensor

Sensor Sensitivity = ISO

International Organization for Standards

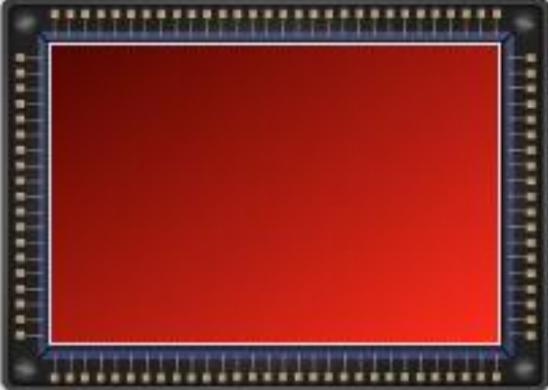


# Sensor Sensitivity

Just like your aperture and your shutter speed, ISO is set up in a series of full stops. If you move from ISO 100 to 200 you double the sensitivity of the sensor and cut in half the amount of light needed for the exposure.

Conversely if you change your ISO from 200 to 100 you will need twice as much light to make the exposure.

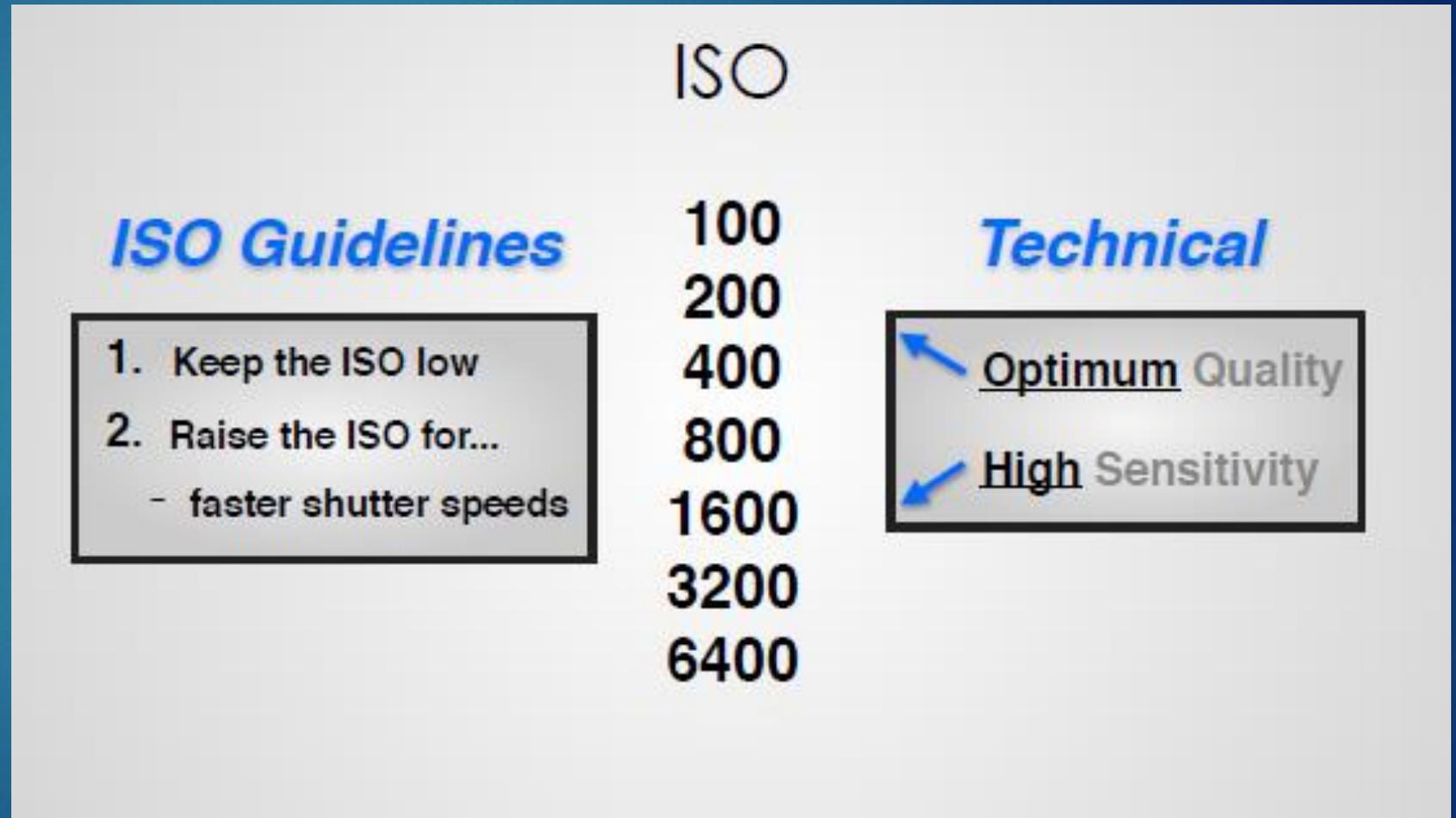
**Sensor Sensitivity = ISO**



100	
200	— 2x as sensitive as ISO 100
400	— 4x as sensitive as ISO 100
800	— 8x as sensitive as ISO 100
1600	— 16x as sensitive as ISO 100
3200	— 32x as sensitive as ISO 100
6400	— 64x as sensitive as ISO 100

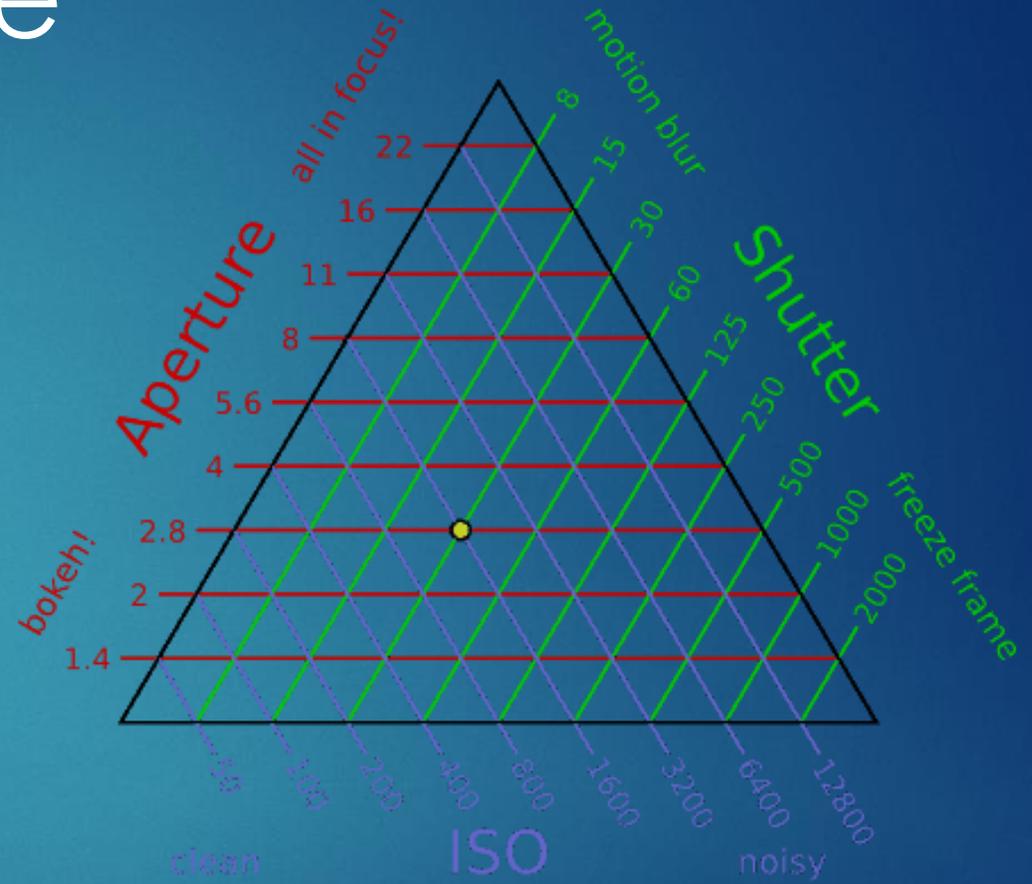
# The Technical and The Creative

ISO also has a technical and a creative side. These are slightly different from those of the shutter and aperture.



# The Exposure Triangle

When you change one of the elements of exposure, you must compensate by moving another in the opposite direction.

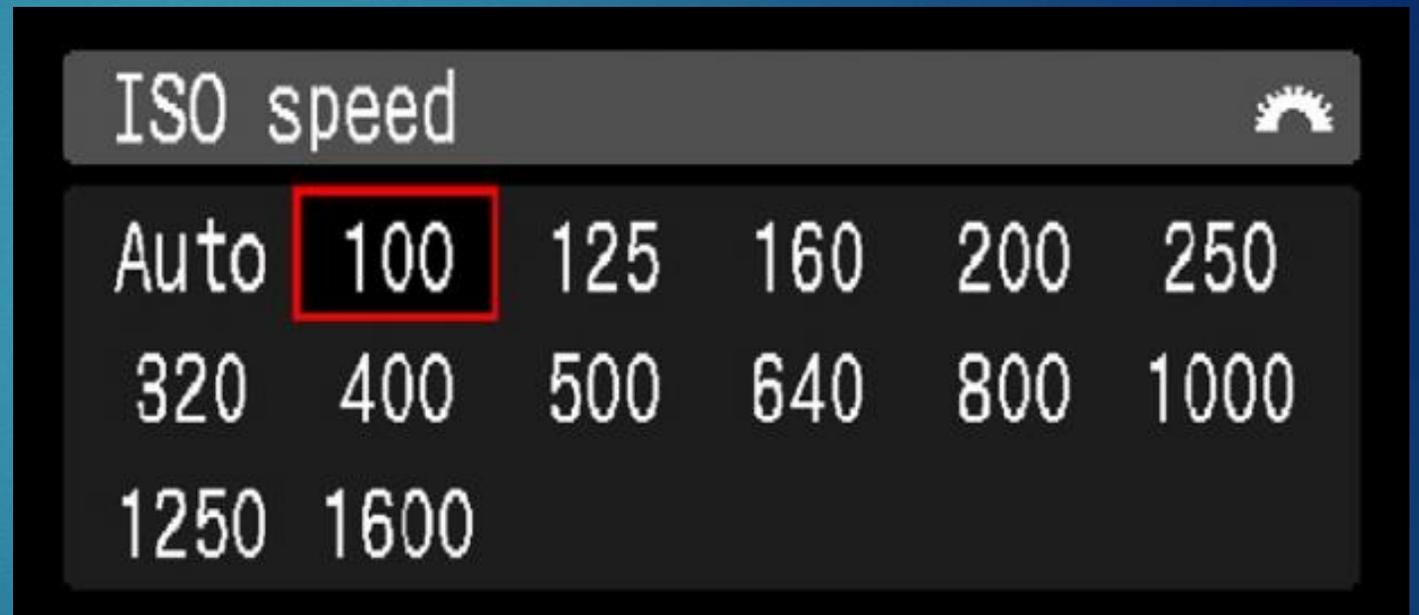


# ISO settings on your camera

The ISO setting can generally be accessed by pushing a specific button on your camera. Let's locate the ISO button on our camera's



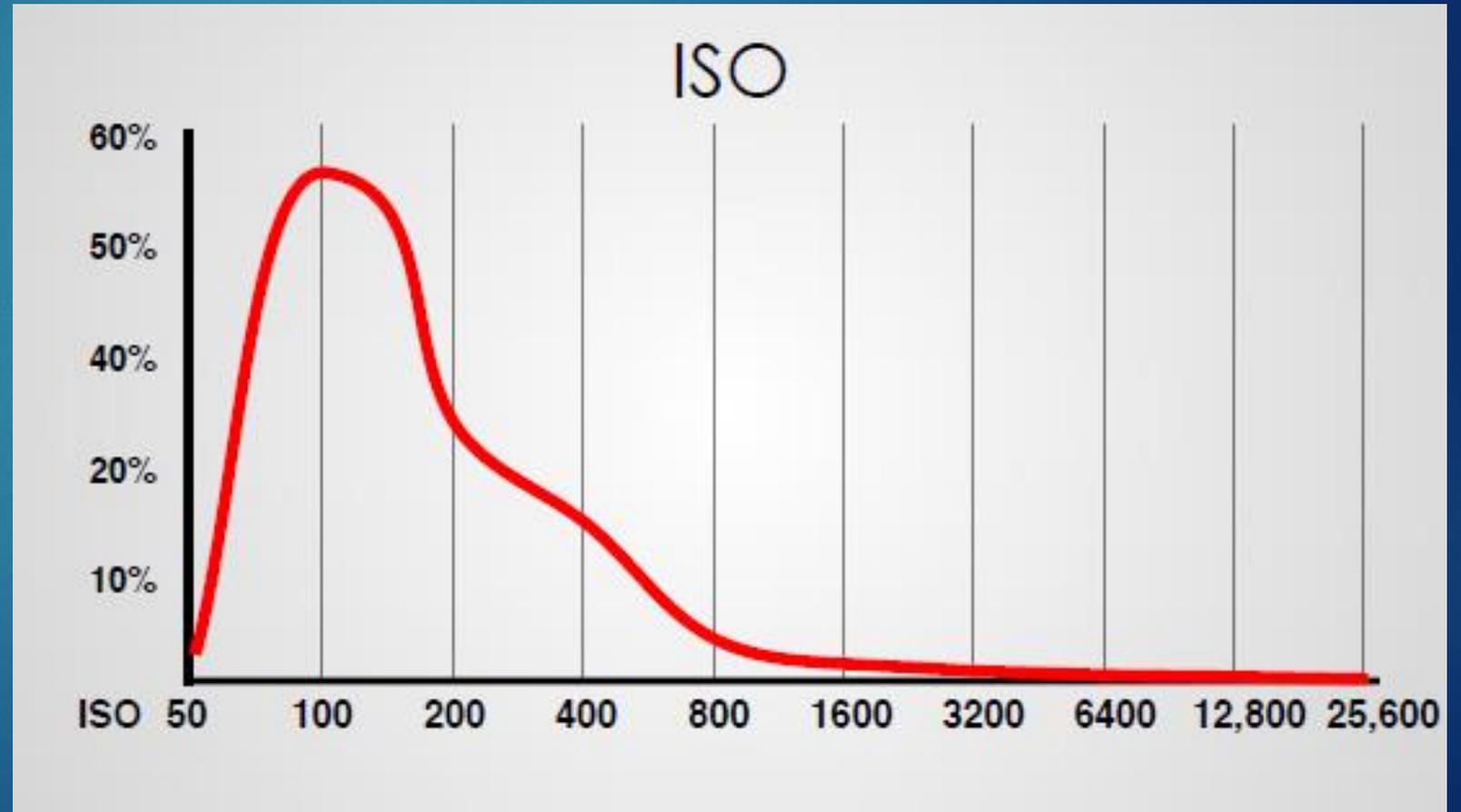
Lower numbers less sensitivity  
High numbers more sensitivity

A screenshot of a camera's ISO speed menu. The menu is titled "ISO speed" and features a sun icon in the top right corner. The ISO values are arranged in three rows: the first row contains "Auto", "100", "125", "160", "200", and "250"; the second row contains "320", "400", "500", "640", "800", and "1000"; the third row contains "1250" and "1600". The "100" value is highlighted with a red rectangular border.

ISO speed 					
Auto	100	125	160	200	250
320	400	500	640	800	1000
1250	1600				

# So – why don't we use a high ISO all the time

The higher the ISO number the more digital noise is present in the image. This chart shows how image quality is reduced as ISO is increased. This will vary by camera sensor size and by camera make and model



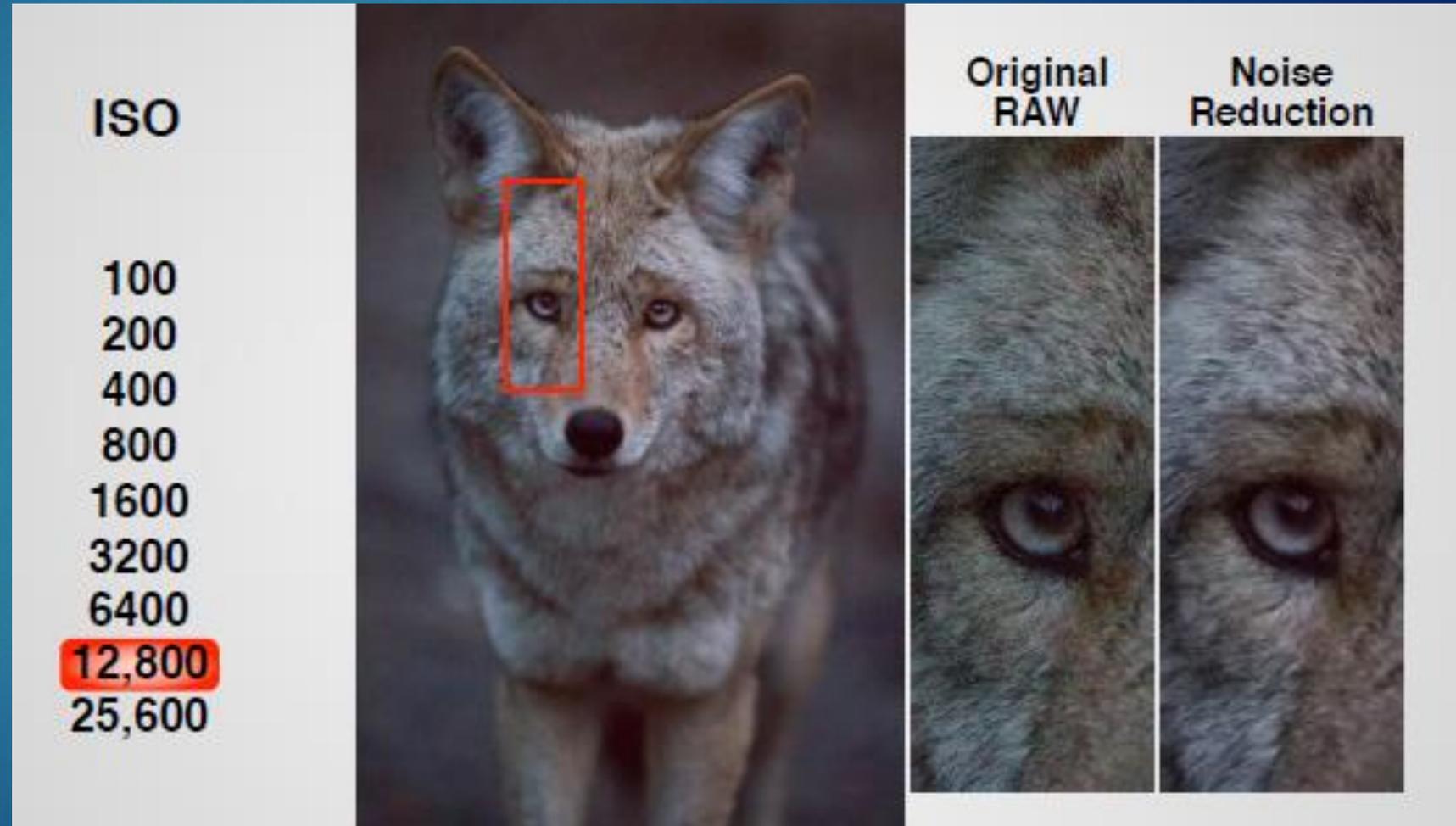
# High ISO = Digital Noise

As you raise your ISO digital noise increases. This varies by sensor type and camera brand. It is good to know how high you can raise your ISO and still get an acceptable image.



# Noise Reduction

Some noise reduction is possible in post production. Programs such as Adobe Lightroom, Photoshop and Photoshop Elements all have noise reducing filters. Third party software is also available to reduce noise.



# Guidelines

Ideally always keep the ISO as low as possible. However, you should raise the ISO as needed to maintain a suitable shutter speed for your subject

## *ISO Guidelines*

1. Keep the ISO low
2. Raise the ISO for...
  - faster shutter speeds

ISO

100

200

400

800

1600

3200

6400

## *Technical*

Optimum Quality

High Sensitivity



ISO

THE CREATIVE SIDE



Ideally always set your ISO as low as possible. In this bright scene it is easy to set your ISO at it's optimal setting, in this case ISO 100.



ISO 100 can be used whenever the camera is locked down on a tripod and shutter speed does not matter.



ISO 400 can be used in daylight when your subject is moving. The added sensitivity allows you to increase your shutter speed

ISO

100

200

400

800

1600

3200

6400



With this well lit interior an ISO of 800 would allow you to hand hold the camera since there is no movement in the scene

ISO

100

200

400

800

1600

3200

6400



An well lit interior with moderate movement may require moving the ISO to 1600

**ISO**

100

200

400

800

**1600**

3200

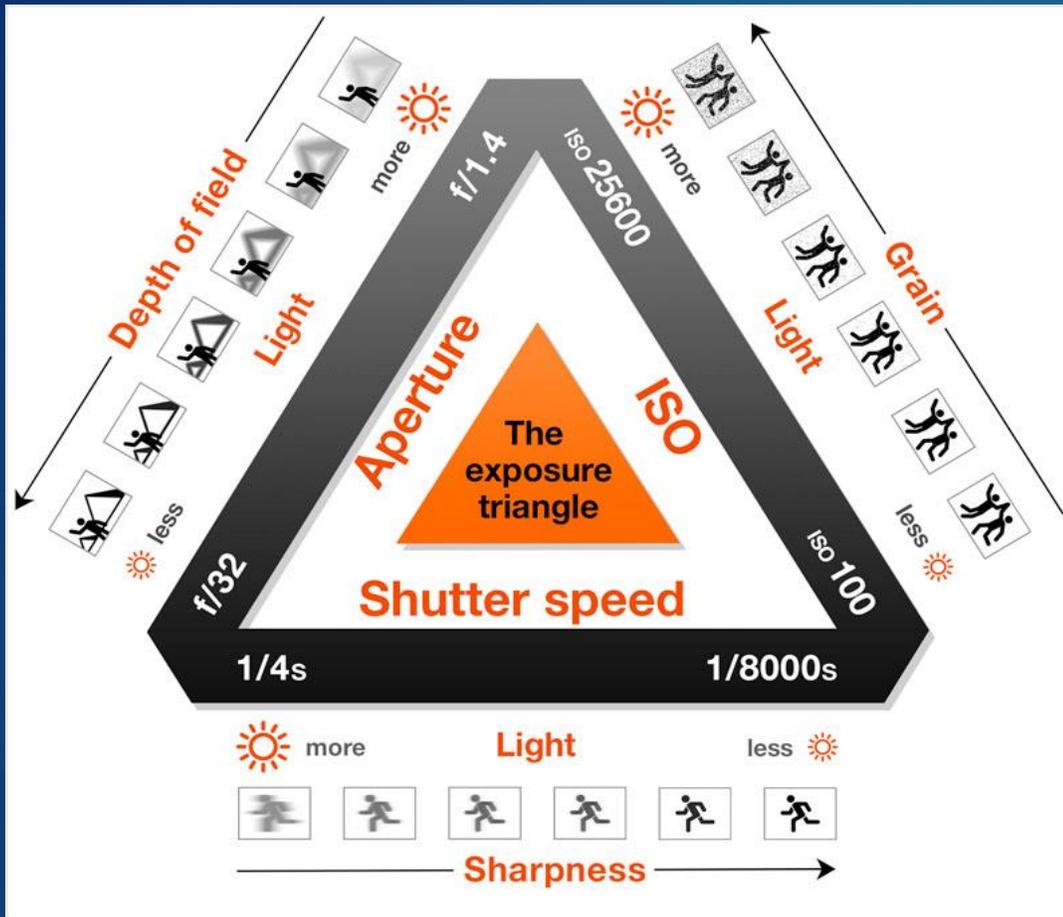
6400



Hand holding your camera in less light with movement requires higher ISO settings



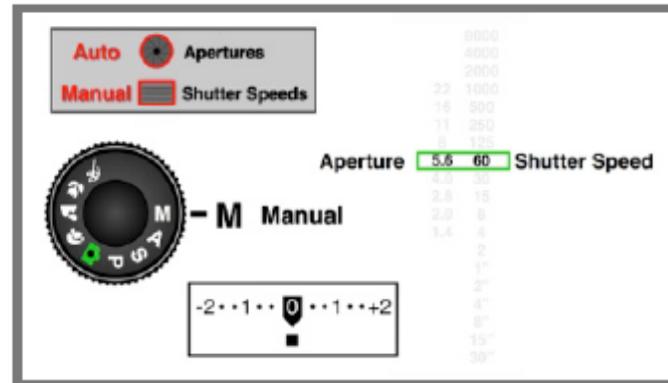
## PUTTING IT ALL TOGETHER



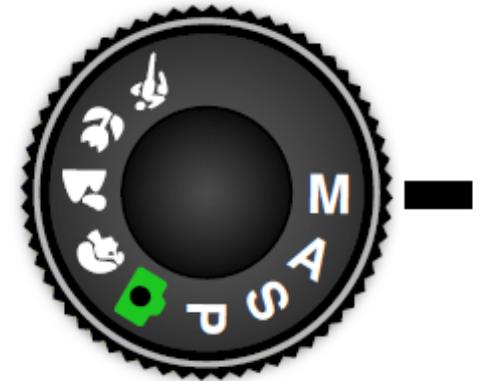
Now that you understand the basic's of exposure we can see how we can use this is setting our camera's to Manual Mode.

# How to Use Manual Mode

Photography is about making decisions. In Manual Mode YOU make the decisions based on your creative vision for the scene.



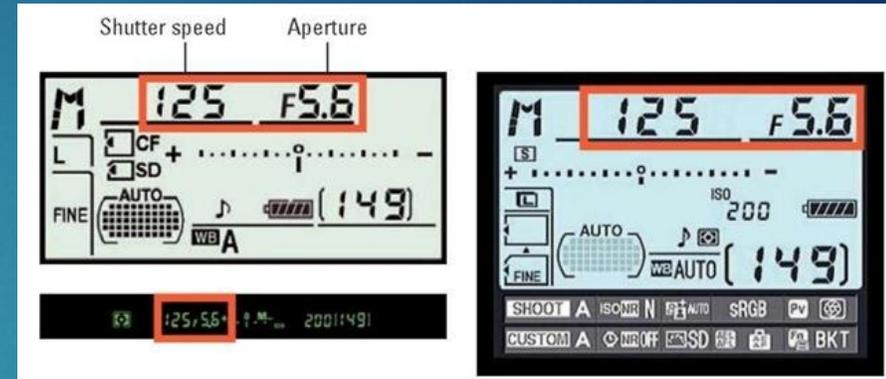
Manual



Manual mode allows you to make choices for Aperture, Shutter Speed and ISO.

# Setting Aperture and Shutter Speed

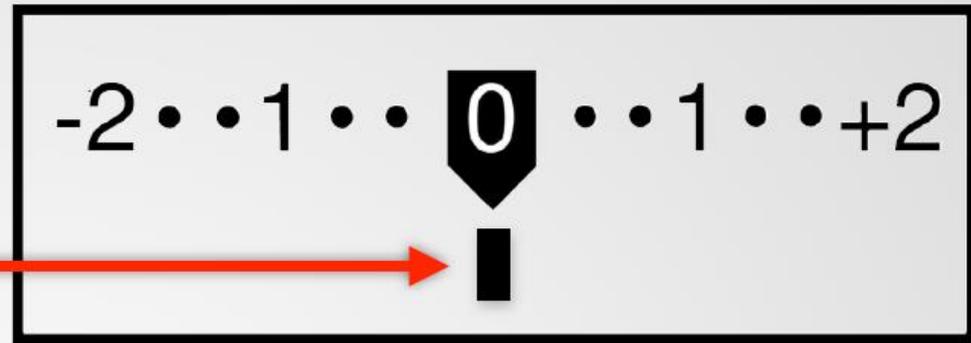
In Manual Mode you have to set both the Aperture and Shutter Speed. In many camera's the command dial will change the shutter speed. To change the aperture you will hold a button (typically the +/- button) while turning the command wheel. Many high end camera's have two separate command dials for this purpose.



# Manual Mode



Exposure Indicator



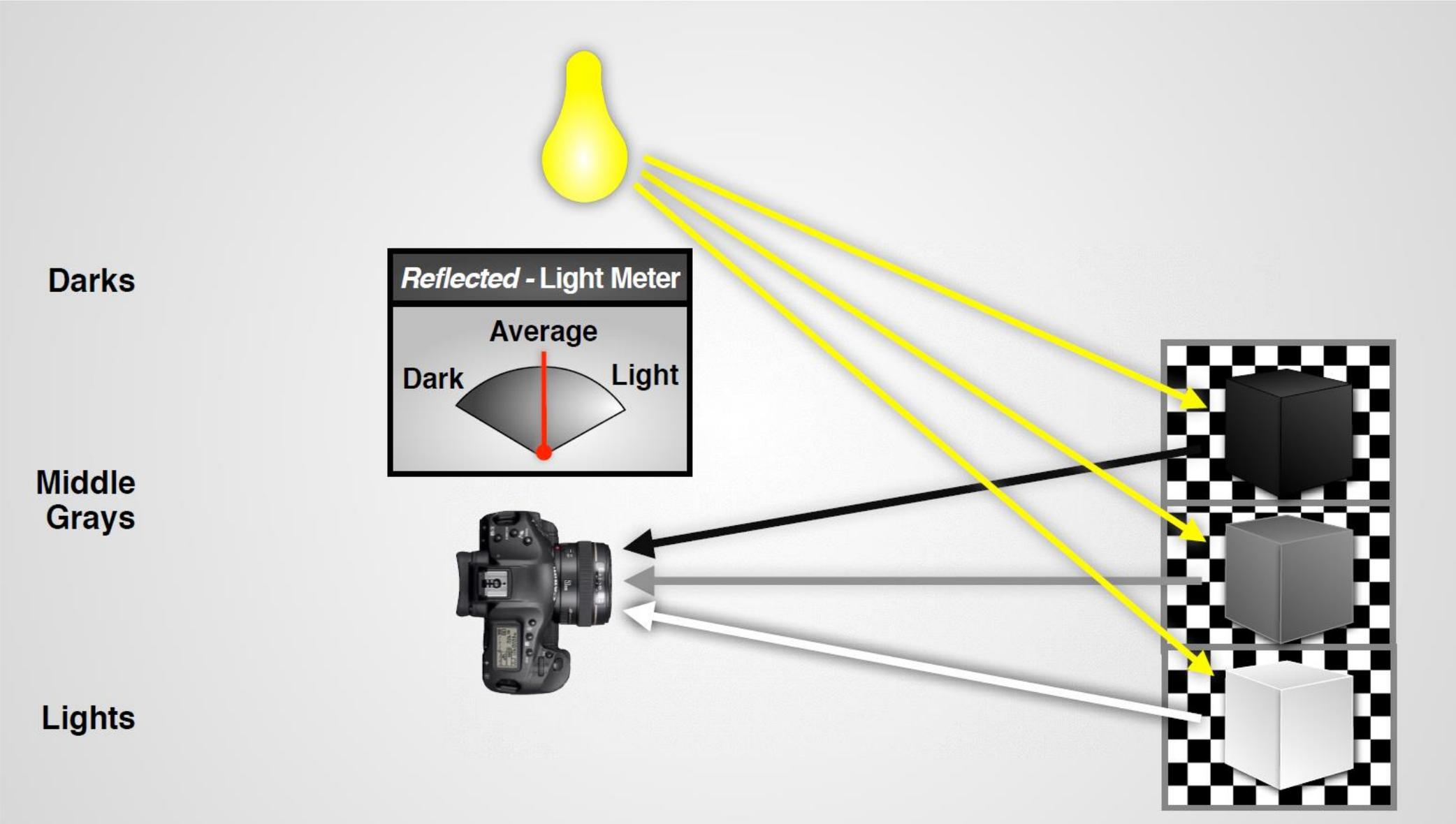
When you look through your viewfinder you will see a scale that looks similar to the one above. Initially you make adjustments to move the pointer to line up with the zero (0). If the pointer is under a negative number the camera is telling you that you are underexposing the image. If it is under a positive number you are overexposing the image. The scale is set up in stops.

# Using an Auto Mode

As the car moves through this scene from a shadow area to an area out of the shadows the camera adjusts exposure to compensate. The light in the scene however is not changing, only the position of the car within that scene is changing. As the car moves through the scene the scene is gradually underexposed as the light relative to the car changes.



# Any of the Auto Modes



In Manual Mode once you set the exposure it stays constant.

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

Aperture	ISO
22	100
16	200
11	400
8	800
5.6	1600
4.0	3200
	6400



**Manual Exposure**

Exposure

# Manual Mode Keeps Settings Constant

In this case, the light in the scene was metered before the car entered the scene and settings were chosen for a good exposure. Now, as the car moves through the scene the camera maintains the set exposure and the scene is properly recorded.



**M** Manual



# Manual Mode

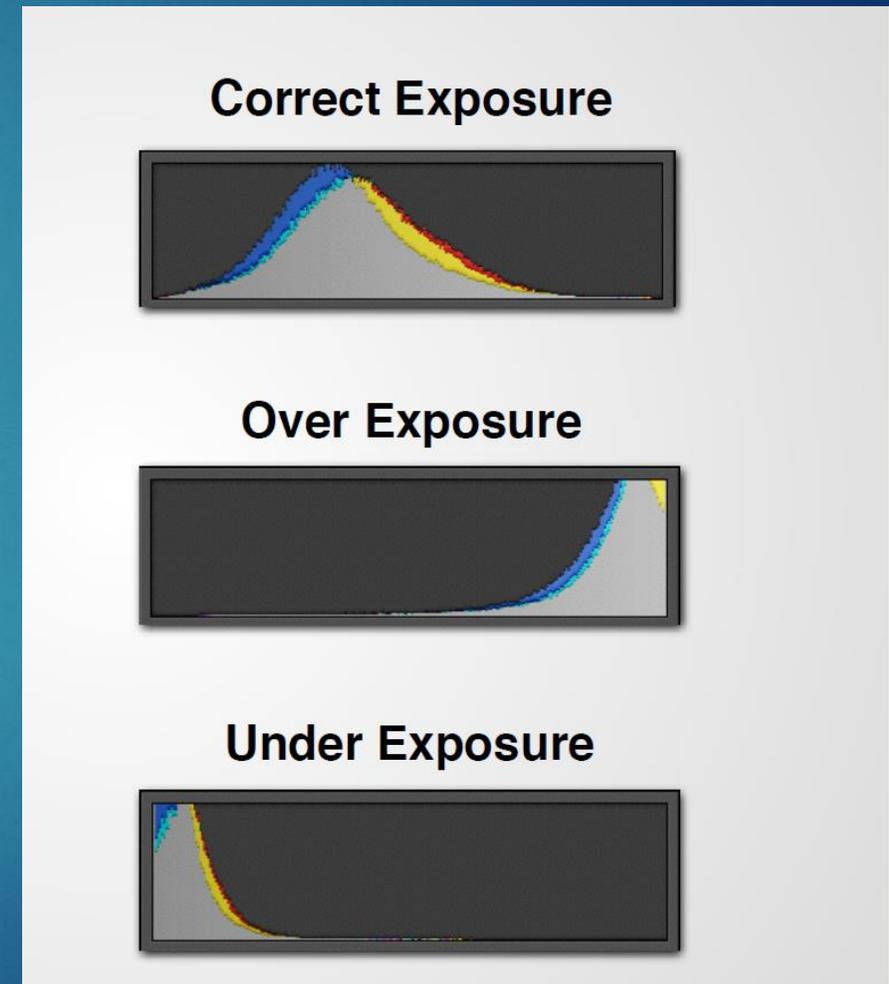
So – If the light levels in the scene remain constant, manual mode is an excellent choice in order to maintain a constant exposure.



- **M** Manual



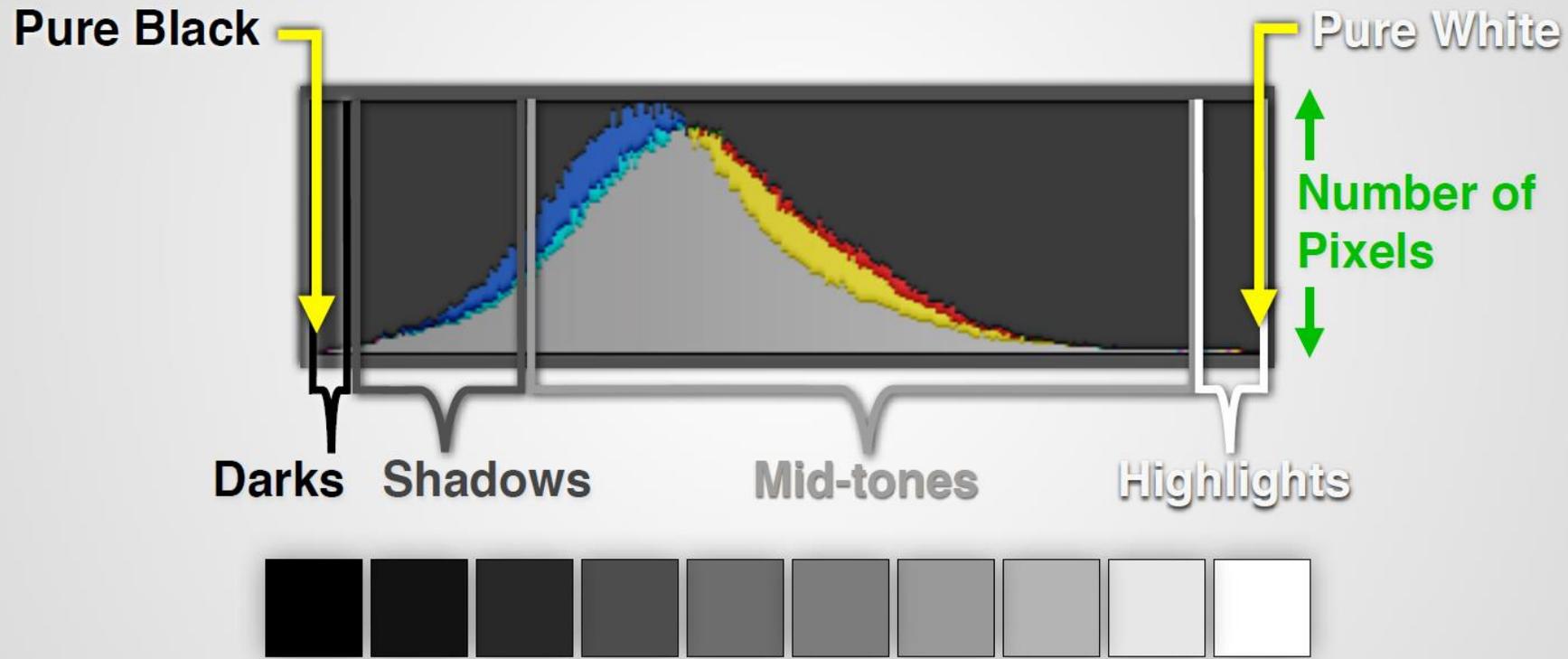
# The Histogram – Key to good Exposure



# The Histogram

Histogram

*Graph of the tonal distribution*

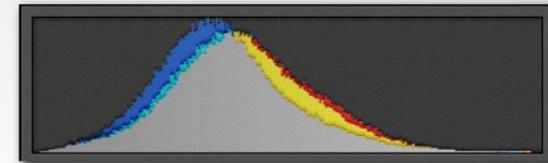


# Use the histogram not your preview image.

The preview image on your view screen is not the best way to judge exposure. It is small and not a true representation of the exposure.

If you use your histogram to judge exposure you will not go wrong. Once you are comfortable reading histograms you will always be able to get a good exposure.

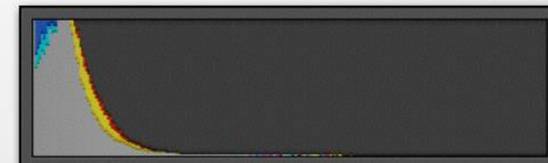
**Correct Exposure**



**Over Exposure**



**Under Exposure**

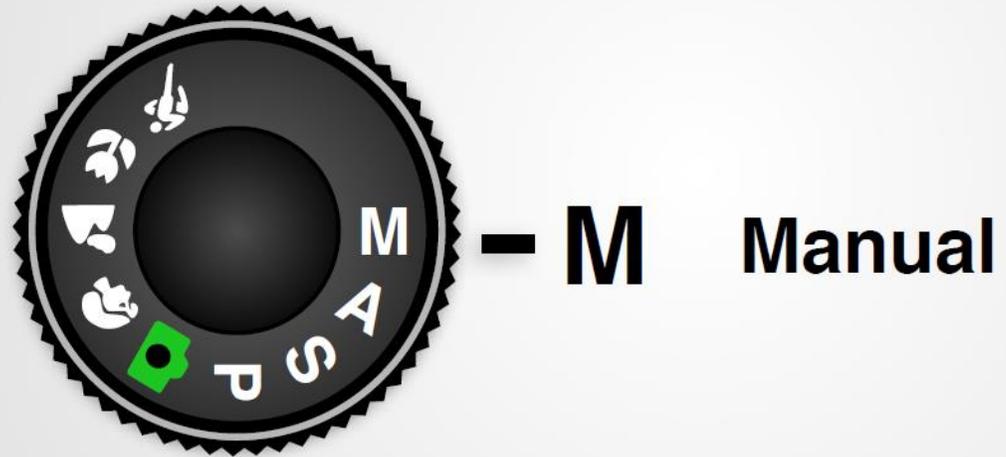


# Manual Mode

You make the choices for Aperture, Shutter Speed and ISO

**Manual**  Apertures

**Manual**  Shutter Speeds



# Manual Mode

There are hundreds of different exposure combinations that will give you a proper exposure. This makes choosing a proper Aperture, Shutter Speed and ISO combination confusing at best for most beginning photographers.

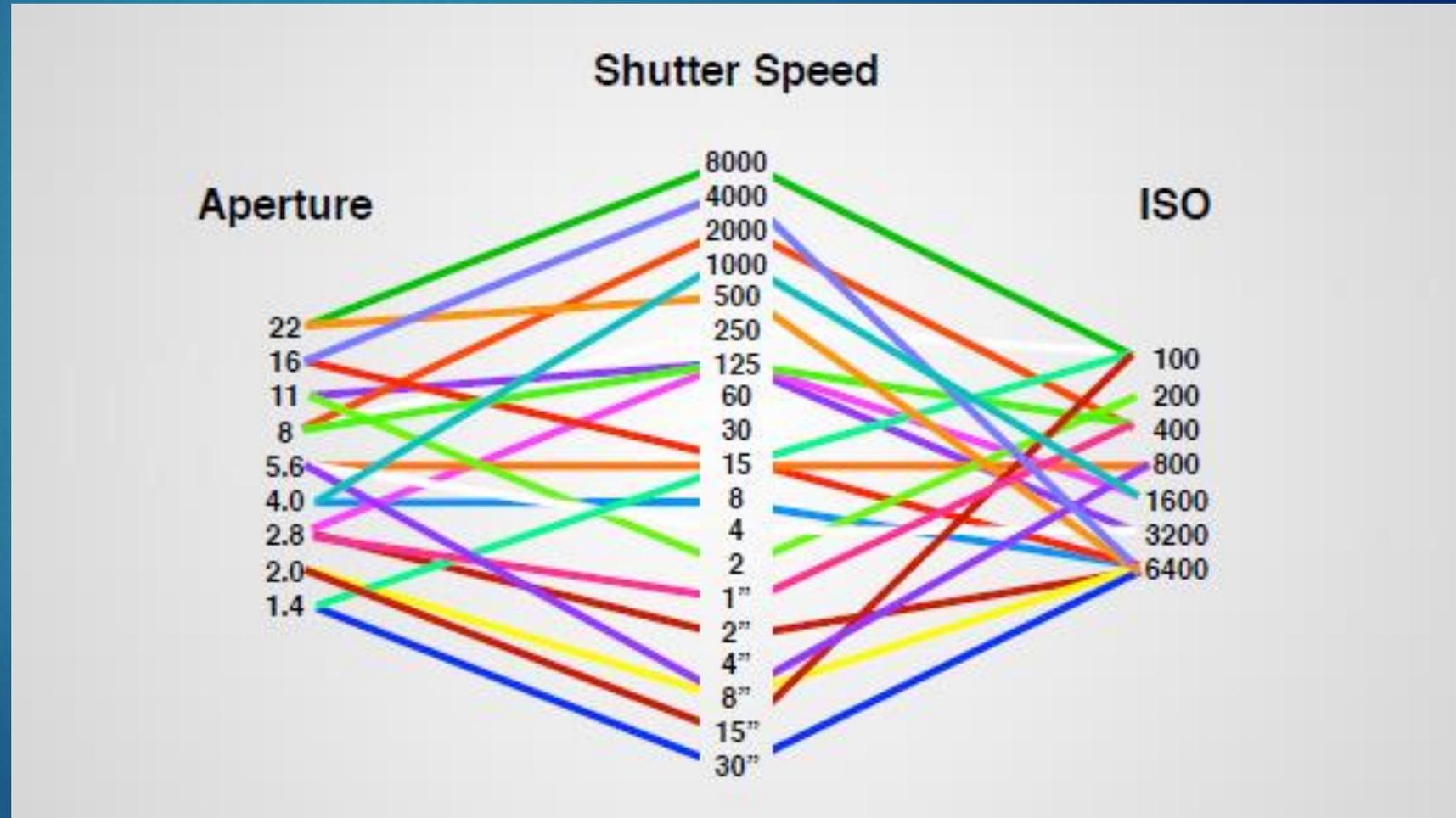
	Shutter Speed	
	8000	
	4000	
	2000	
	1000	
	500	
	250	
Aperture	125	ISO
22	60	100
16	30	200
11	15	400
8	8	800
5.6	4	1600
4.0	2	3200
	1"	6400
	2"	
	4"	
	8"	
	15"	
	30"	



**Manual Exposure**

Exposure

# How do you choose the right combination?

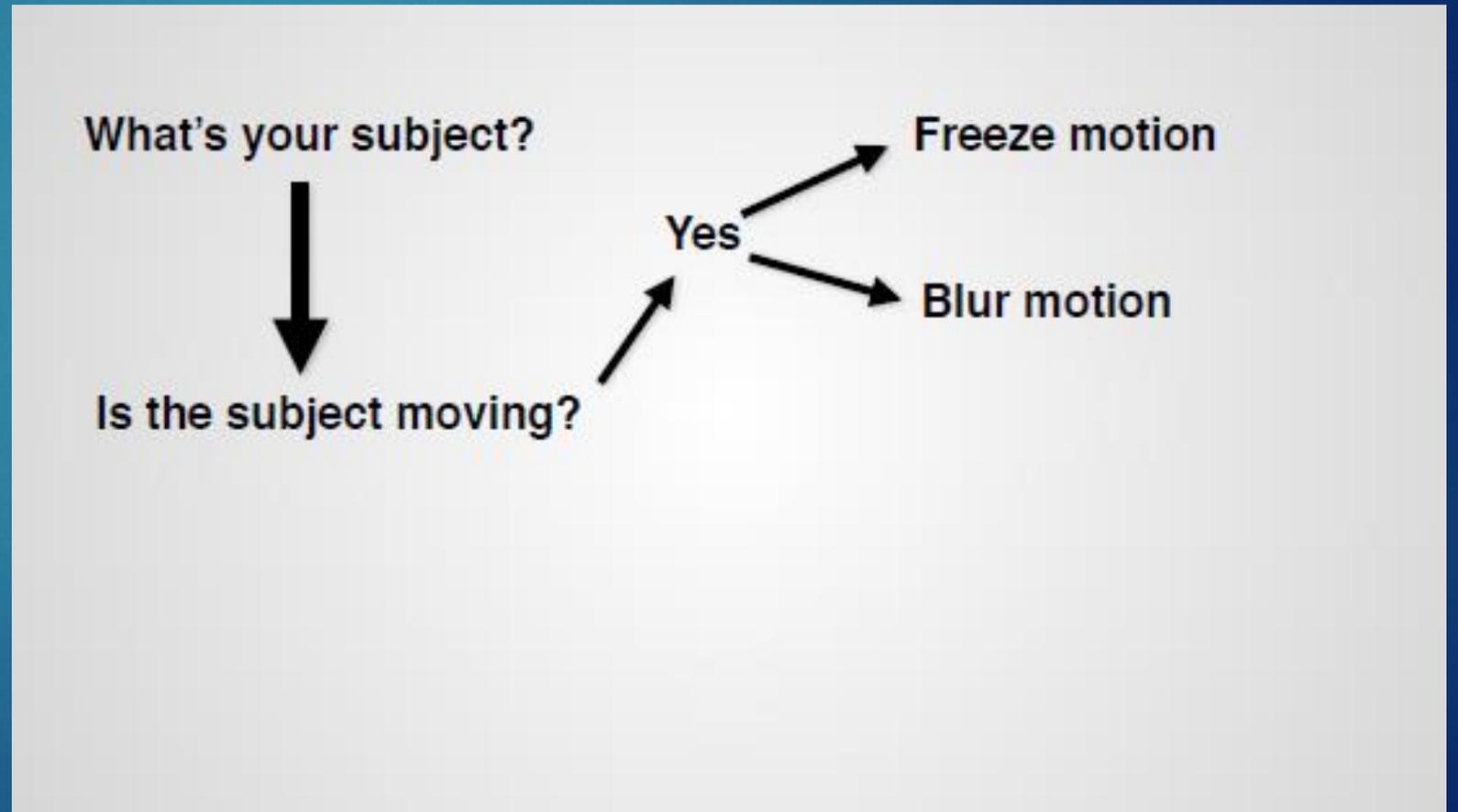


# It's simple - really

- Start with your subject and ask yourself –
  - Is the Subject Moving?

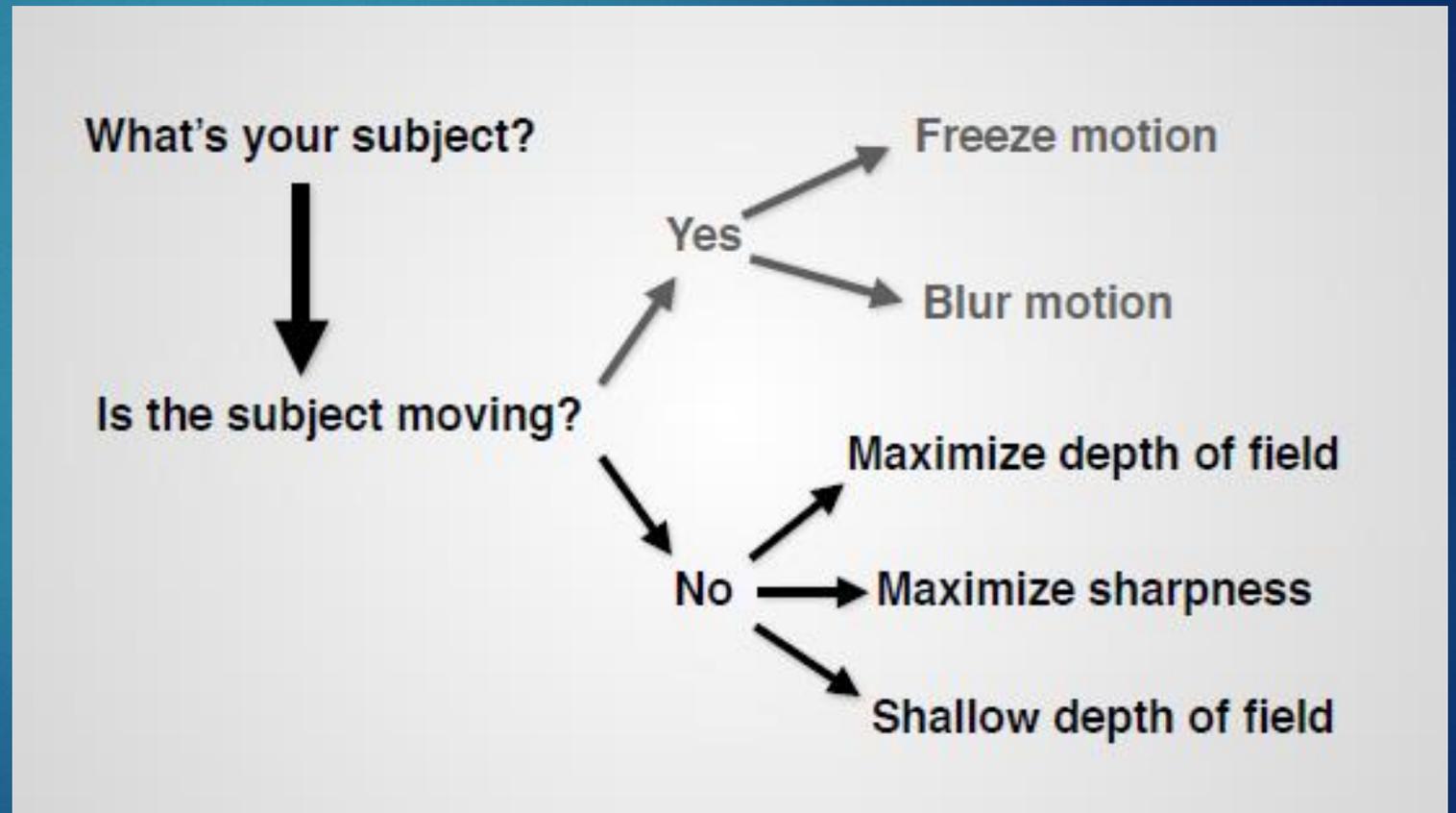
Do you remember what controls motion?

Shutter Speed controls motion. A fast shutter speed will freeze motion. A slow shutter speed will blur motion.



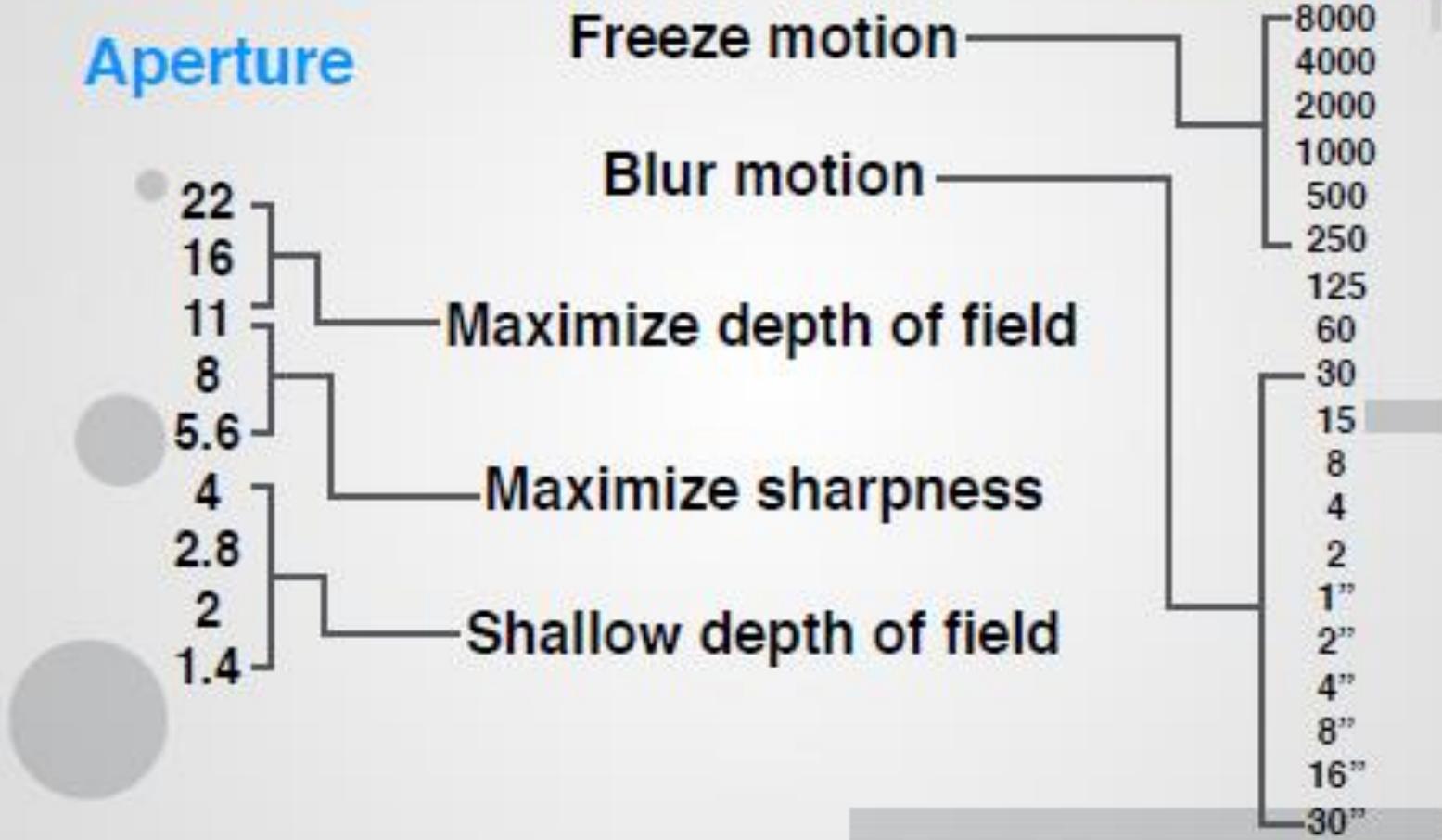
# Exposure made simple

If the answer is **NO** then choose an aperture that is appropriate for your creative vision. If you want maximum DOF set a small aperture (f/16, f/22, f/32). If you want maximum sharpness choose a mid range aperture (f/11, f/8, f/5,6). If you want shallow depth of field set a large lens opening (f/4, f/2.8, f/1.4)



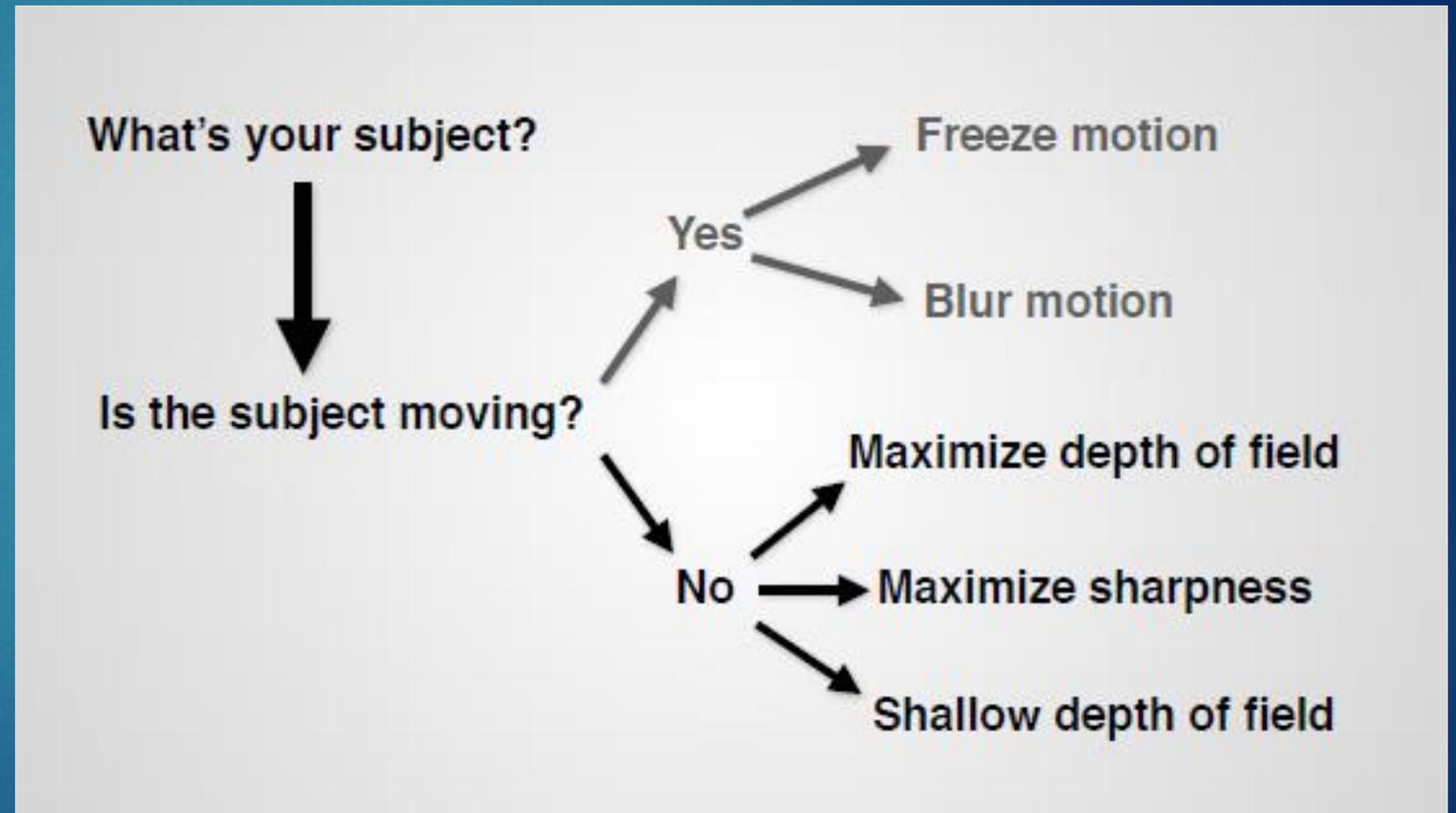
# Shutter Speed

## Aperture



This is an important concept and key to making creative and technical choices.

Let's look at some examples.



# Examples

## Freeze motion



## Shutter Speed

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

## Aperture

22  
16  
11  
8  
5.6  
4.0

## ISO

100  
200  
400  
800  
1600  
3200  
6400



**Freeze motion**



## Shutter Speed

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

## Aperture

22  
16  
11  
8  
5.6  
4.0

## ISO

100  
200  
400  
800  
1600  
3200  
6400



Freeze motion



# Blur motion



## Shutter Speed

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

## Aperture

22  
16  
11  
8  
5.6  
4.0

## ISO

100  
200  
400  
800  
1600  
3200  
6400



**Blur motion**



## Shutter Speed

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

## Aperture

- 22
- 16
- 11
- 8
- 5.6
- 4.0

## ISO

- 100
- 200
- 400
- 800
- 1600
- 3200
- 6400



**Blur motion**



Maximize  
depth of field



Aperture	Shutter Speed	ISO
22	8000	100
16	4000	200
11	2000	400
8	1000	800
5.6	500	1600
4.0	250	3200
	125	6400
	60	
	30	
	15	
	8	
	4	
	2	
	1"	
	2"	
	4"	
	8"	
	15"	
	30"	



Maximize  
depth of field

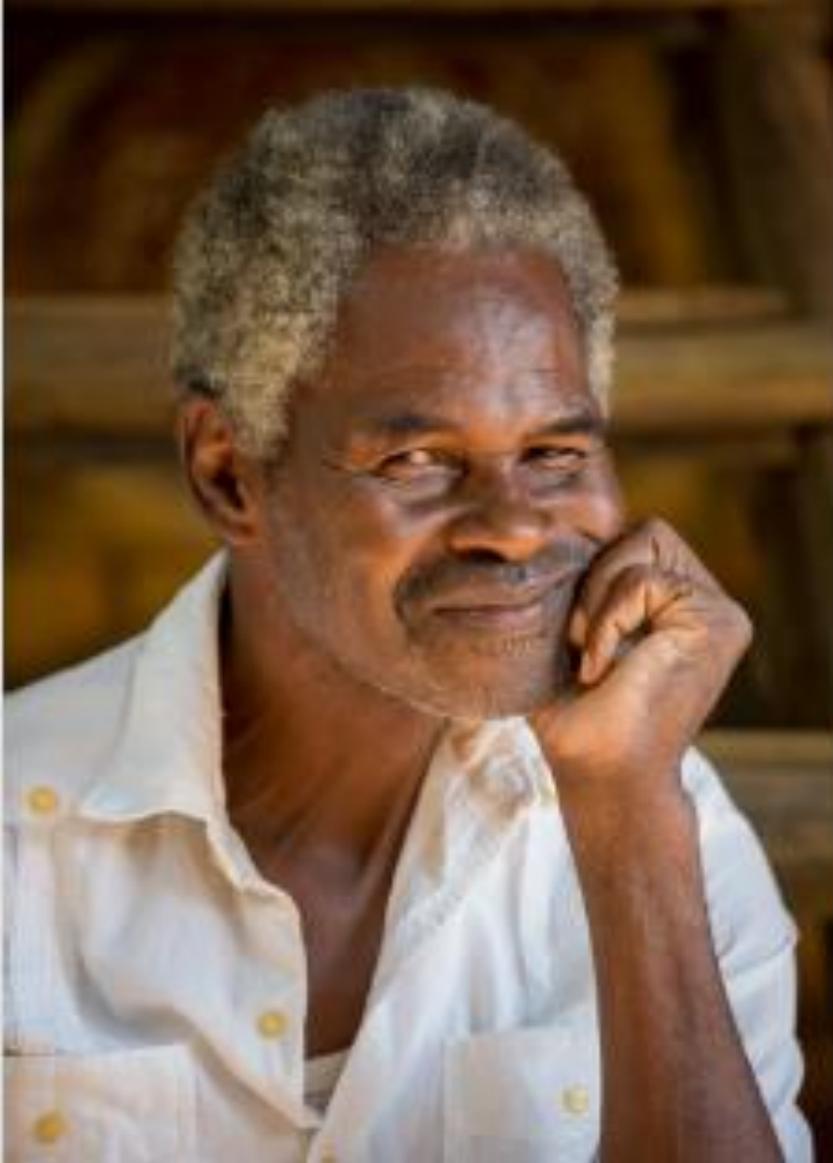


		Shutter Speed	
		8000	
		4000	
		2000	
		1000	
		500	
		250	
		<b>125</b>	
		60	
		30	
		15	
		8	
		4	
		2	
		1"	
		2"	
		4"	
		8"	
		15"	
		30"	
Aperture			ISO
<b>22</b>		<b>100</b>	
16		200	
11		400	
8		800	
5.6		1600	
4.0		3200	
		6400	



Maximize  
depth of field





**Shallow  
depth of field**

Aperture	Shutter Speed	ISO
	8000	
	4000	
	2000	
	1000	
	500	
	250	
	125	
	60	100
	30	200
22	15	400
16	8	800
11	4	1600
8	2	3200
5.6	1"	6400
4.0	2"	
	4"	
	8"	
	15"	
	30"	



**Shallow  
depth of field**



		<b>Shutter Speed</b>	
		8000	
		4000	
		2000	
		1000	
		500	
		250	
		<b>125</b>	
		60	
		30	
		15	
		8	
		4	
		2	
		1"	
		2"	
		4"	
		8"	
		15"	
		30"	
<b>Aperture</b>			<b>ISO</b>
			<b>100</b>
			200
22			400
16			800
11			1600
8			3200
5.6			6400
<b>4.0</b>			



**Shallow  
depth of field**



Maximize  
Sharpness



No Tripod

## Shutter Speed

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

## Aperture

22  
16  
11  
8  
5.6  
4.0

## ISO

100  
200  
400  
800  
1600  
3200  
6400



Maximize  
**Sharpness**



No Tripod

## Shutter Speed

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

## Aperture

22  
16  
11  
8  
5.6  
4.0

## ISO

100  
200  
400  
800  
1600  
3200  
6400



Maximize  
Sharpness



With Tripod

### Aperture

22

16

11

8

5.6

4.0

### Shutter Speed

8000

4000

2000

1000

500

250

125

60

30

15

8

4

2

1"

2"

4"

8"

15"

30"

### ISO

100

200

400

800

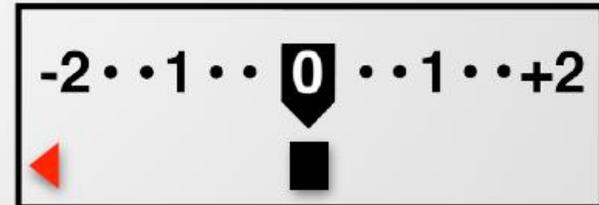
1600

3200

6400



Maximize  
**Sharpness**



# Tricky Exposures



## Shutter Speed

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

## Aperture

22  
16  
11  
8  
5.6  
4.0

## ISO

100  
200  
400  
800  
1600  
3200  
6400



## Tricky Exposures



# Shutter Speed

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

# Aperture

- 22
- 16
- 11
- 8
- 5.6
- 4.0

# ISO

- 100
- 200
- 400
- 800
- 1600
- 3200
- 6400



# Tricky Exposures

