

Capturing the Picture You Want



Getting Off Automatic

Using Shutter Speed, f/stops and ISO to Your Advantage

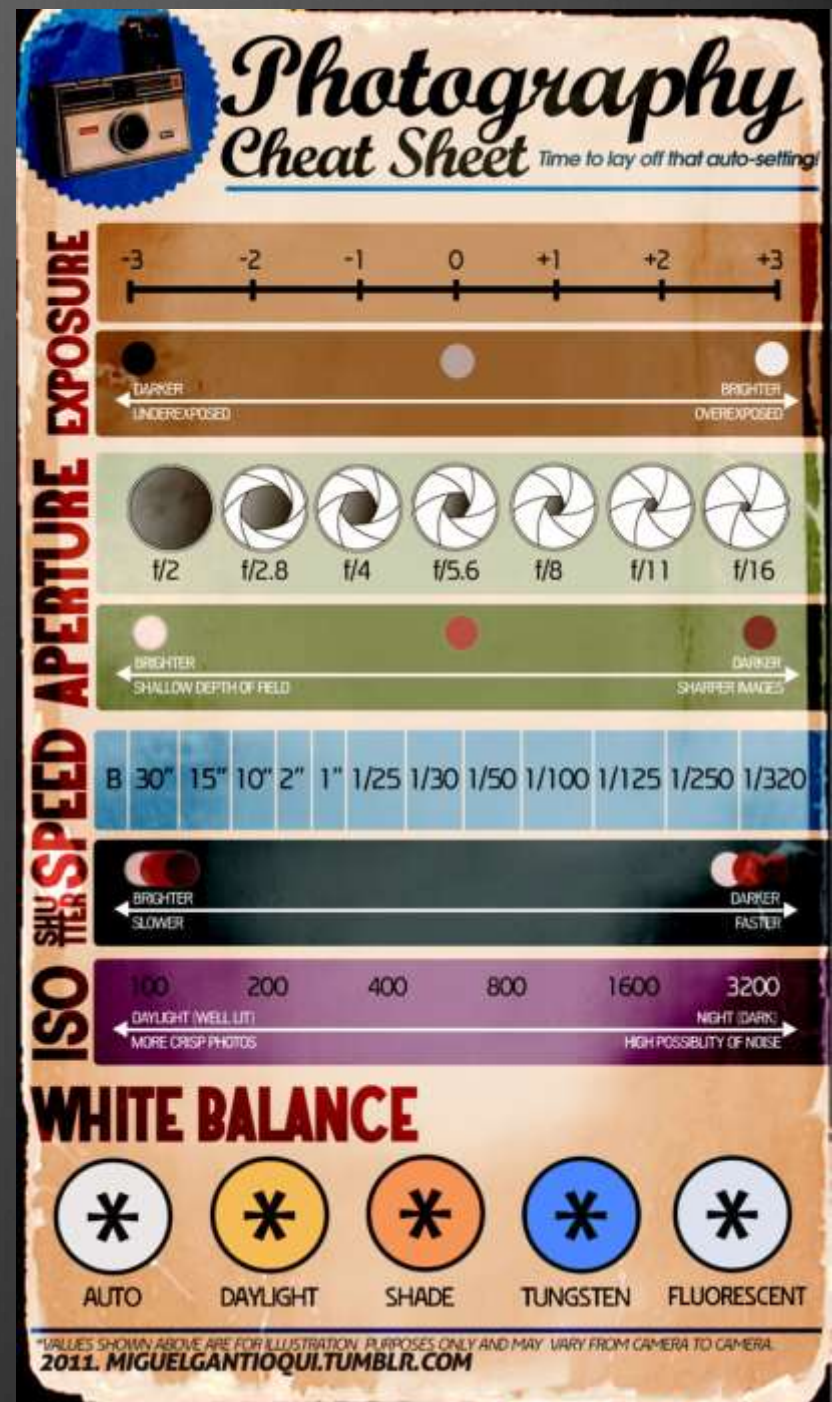


Today's Schedule

- ⦿ Presentation 45 minutes or so.
- ⦿ Breaks for Questions.
- ⦿ Shooting assignment putting to use things learned.
- ⦿ Questions or items you would like me to emphasize in presentation?

Reference Card

- 🎥 This image has distilled 80% of today's class key points into one page.



Capturing the Photo You Want





Capturing
the Photo
You Want



Capturing the Photo You Want



Capturing the Photo You Want

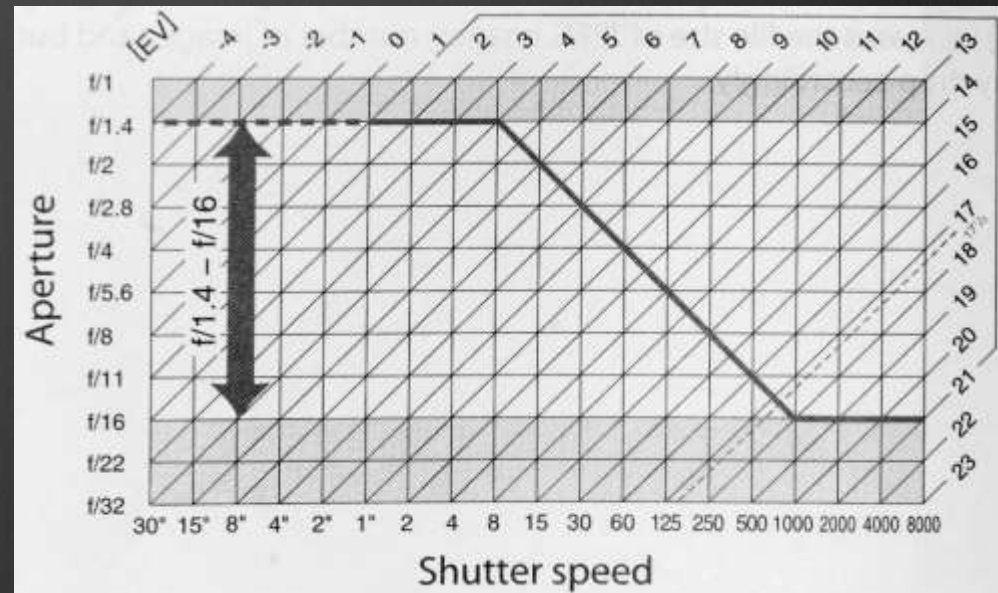


Capturing the Photo You Want



Capturing the Photo You Want

- When set on Automatic the camera has its own built-in logic for setting shutter speed and lens opening (aperture or f/stop). Some add in adjusting the ISO too.
- That logic may not give you what you want.
- To understand the control you have we need to look at....



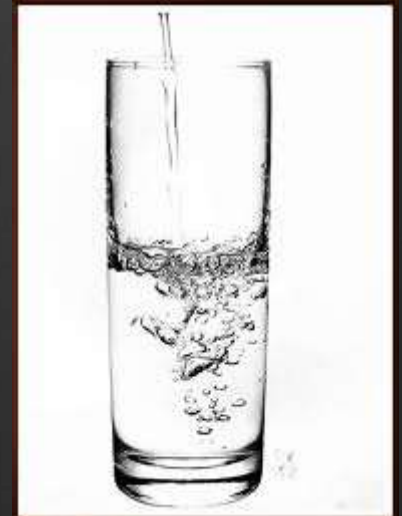
The Technical Side

- 🎬 To make a properly exposed image you need to capture the right amount of light.
- 🎬 Controlled by: Shutter speed, f/stop and ISO.



The Goal - Overview

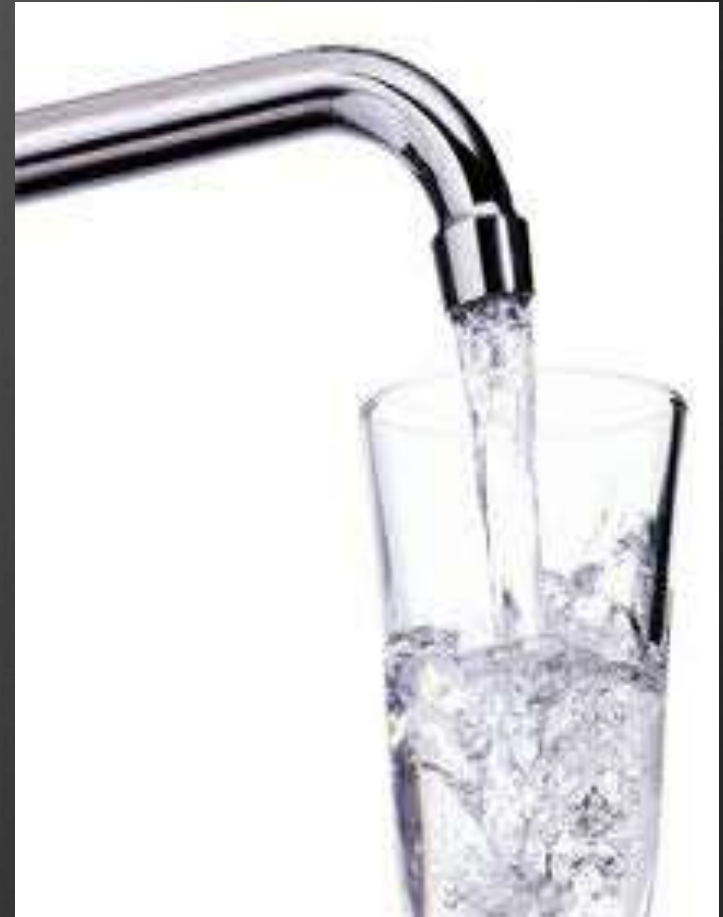
- Understand the variables in collecting light and their impact on the image.
- Think of the light collection as filling a glass of water to the brim from a kitchen sink faucet.
- We want to fill the glass just full.
 - If not full, the image is too dark.
 - If running over, the image is too light.



Analogy for Exposure

There are 3 variables' for light collection.

- ❁ Shutter speed equals how long we leave the faucet on. A longer time puts more water in the glass.
- ❁ f/stop is how big the faucet is. A bigger faucet fills the glass faster.
- ❁ ISO is how big the glass is. A bigger glass takes longer to fill.



Shutter Speed

- ⦿ Shutter speeds can range from several seconds to as short as $1/8,000$ of a second.
- ⦿ A partial list of full steps look like this: $1/30$, $1/60$, $1/125$, $1/250$, $1/500$, $1/1000$.
- ⦿ The speeds double in the progression, each step letting in half as much light as the previous step.

Effects of Various Shutter Speeds

A slower shutter speed blurs action while a faster shutter speed freezes motion.



Shutter Speed Examples



1/2,000 second



1/15 second

Shutter Speed Examples



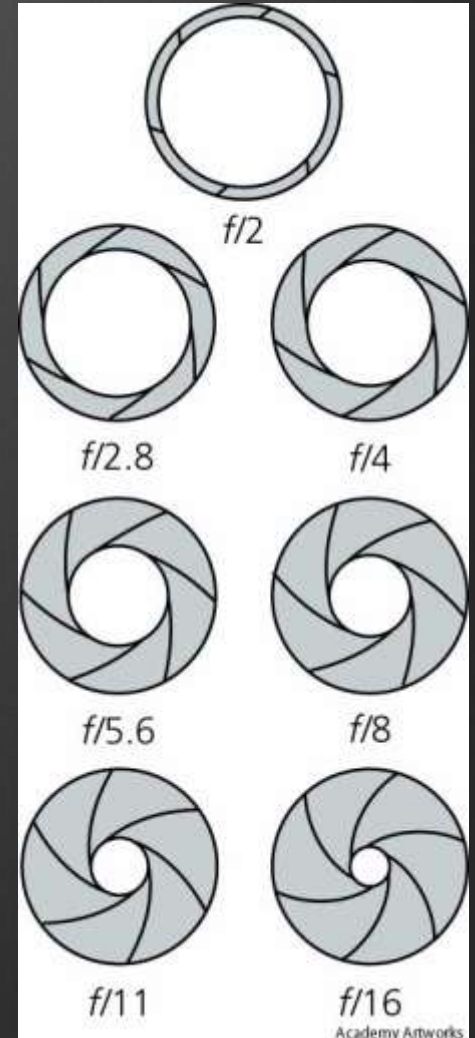
Questions?

1/2,000 second

1/15 second

f/stop or Aperture

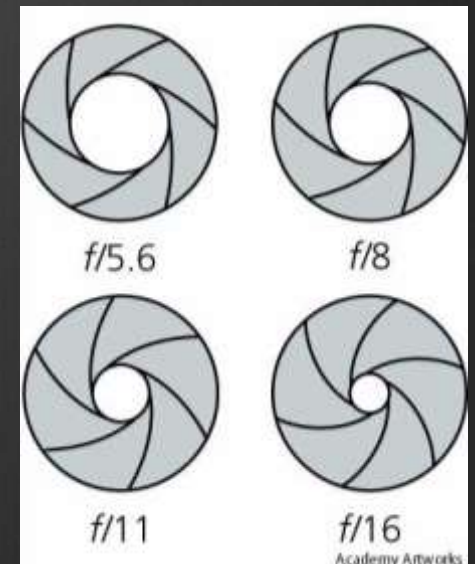
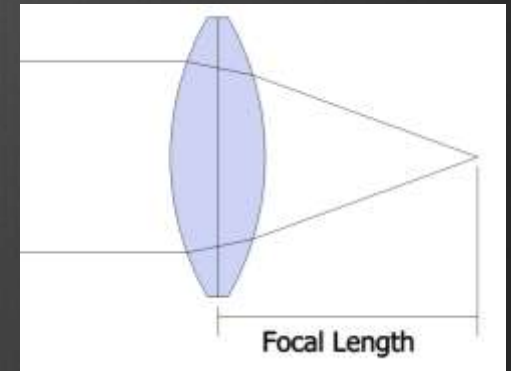
- 🎬 In our glass of water analogy f/stop is how big the faucet is. A bigger faucet fills the glass faster.
- 🎬 The smaller the f/stop number the bigger the opening. A partial list of full f/stops looks like the illustration.
- 🎬 Each stop increase lets in half as much light as the previous step.



f/stop or Aperture

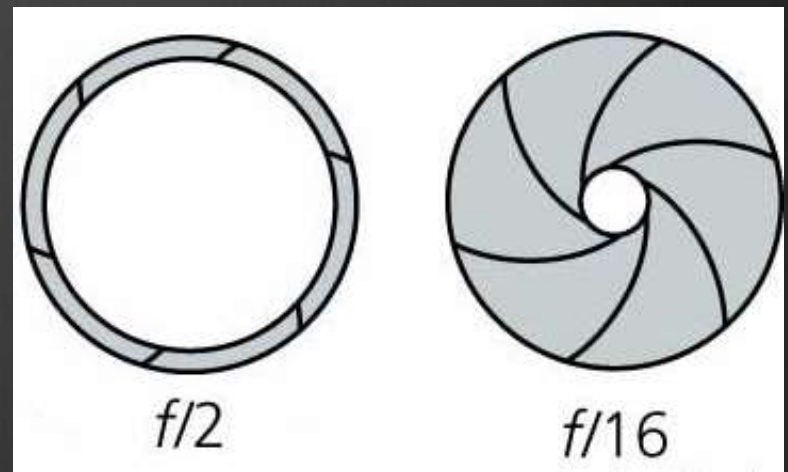
Geek Alert! More than you want to know.

- 🎬 The definition of f/stop is:
The ratio of the focal length of the lens to the diameter of the aperture.
- 🎬 Example: A lens with a focal length of 80mm and an aperture opening of 10mm equals $f/8$ ($80/10 = 8$).



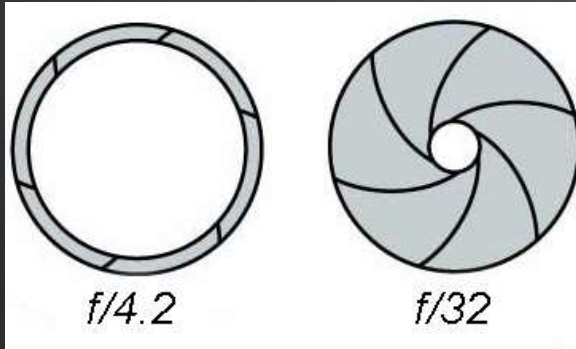
Depth of Field

- ❁ *Depth of Field* (DoF) is the distance between the nearest and farthest objects that appear in sharp focus in a photograph.
- ❁ The *Depth of Field* changes with the f/stop.
- ❁ A bigger opening like f/2 gives less of a *Depth of Field* than a smaller opening like f/16.



Depth of Field

An example of going from a big ($f/4.2$) to a small, ($f/32$) aperture. Focus is on the salt container.



DoF can guide what we want people to focus on.

Depth of Field

- There are two other items that impact the Depth of Field.
 - The focal length of the lens. A longer lens has a shallower the depth of field. For example a 200mm lens will have a shallower DoF than an 18mm lens.
 - The closer you are to the subject the shallower the depth of field.

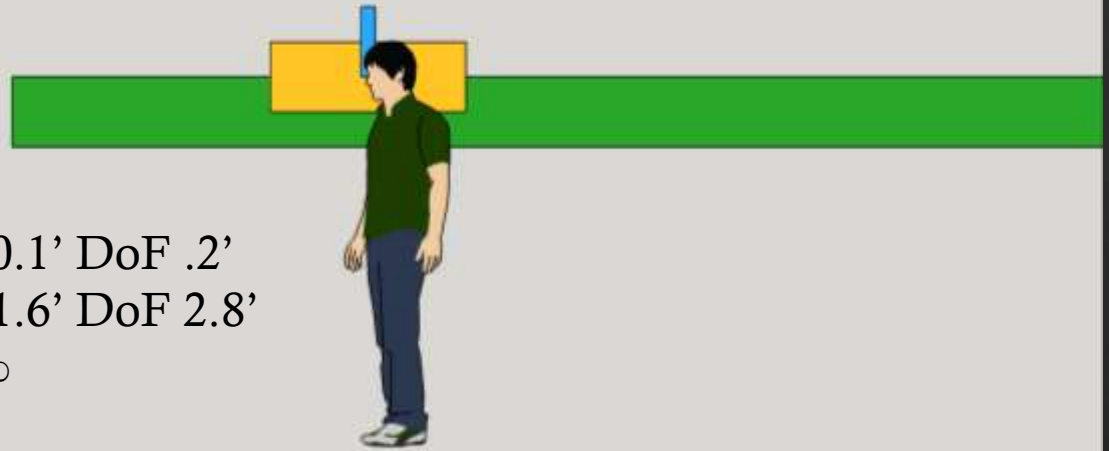
Depth of Field

Same distance of 10' with Different *f stops*



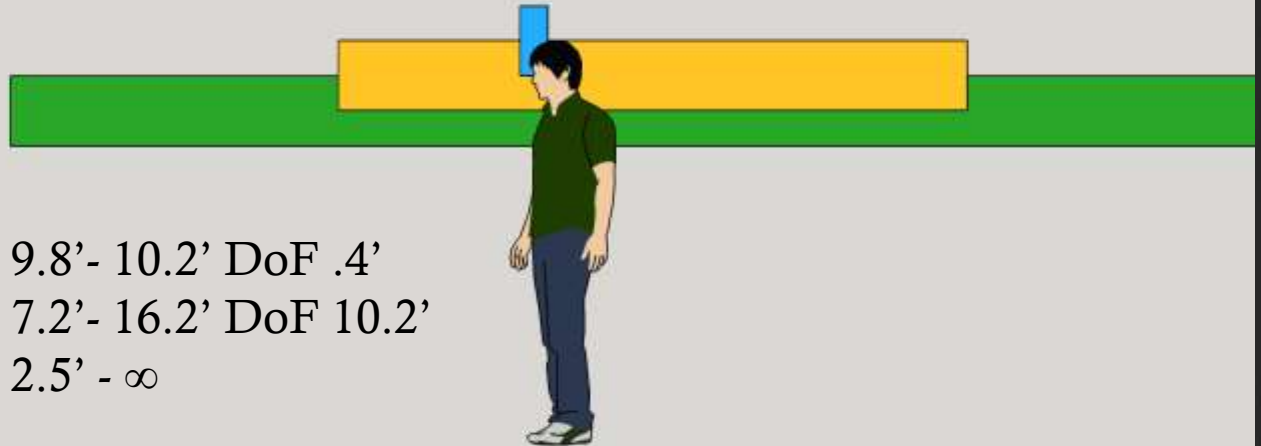
f/5.6

Blue	200mm	9.9' - 10.1' DoF .2'
Yellow	50mm	8.8' - 11.6' DoF 2.8'
Green	18mm	4.9' - ∞



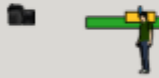
f/16

Blue	200mm	9.8' - 10.2' DoF .4'
Yellow	50mm	7.2' - 16.2' DoF 10.2'
Green	18mm	2.5' - ∞



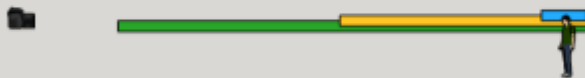
Depth of Field

Same Aperture of 5.6 at Different *Distances*



Camera to Subject 10'

Blue	200mm	9.9' - 10.1' DoF .2'
Yellow	50mm	8.8' - 11.6' DoF 2.8'
Green	18mm	4.9' - ∞



Camera to Subject 50'

Blue	200mm	48' - 52.2' DoF 4.2'
Yellow	50mm	29.6' - 160' DoF 130.4'
Green	18mm	7.9' - ∞

Depth of Field Examples

Adjusting f/stop can isolate the subject from background or bring everything into focus.

f/5.6



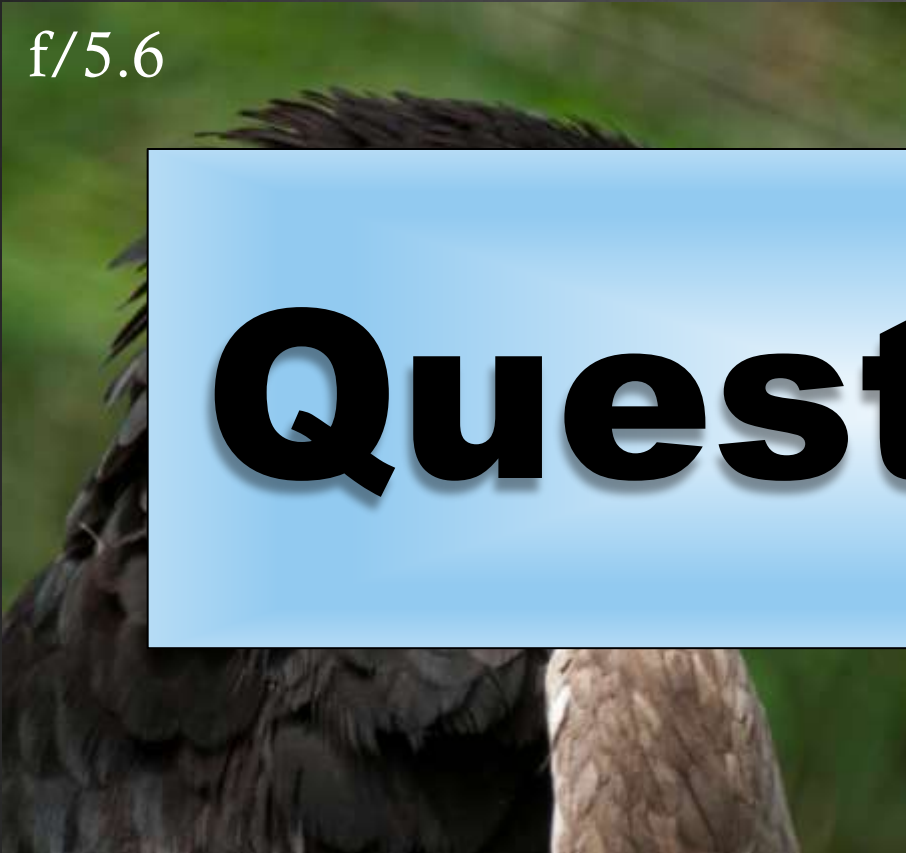
f/22



Depth of Field Examples

Adjusting f/stop can isolate the subject from background or bring everything into focus.

f/5.6



f/22



Questions?

ISO

- 🎬 In our glass of water analogy ISO is how big the glass is. A bigger glass takes longer to fill while a smaller glass takes less time.
- 🎬 The higher the ISO the more sensitive the camera is to light. For example, an ISO setting of 200 needs half as much total light as ISO 100 and twice as much as ISO 400.
- 🎬 This means at a higher ISO a faster shutter speed and/or a smaller aperture can be used.

ISO

- ❁ So why not just set ISO at 2,000 and leave it?
- ❁ A higher ISO degrades photo quality.
- ❁ Personal taste, sensor quality in camera and end use of images will determine highest usable ISO.
- ❁ In general a DSLR will be able to use a higher ISO than a Point and Shoot camera.

(DSLR)
Digital Single
Lens Reflex
Camera



Point and Shoot Camera

ISO

Example of decrease in quality when going from a low to high ISO.

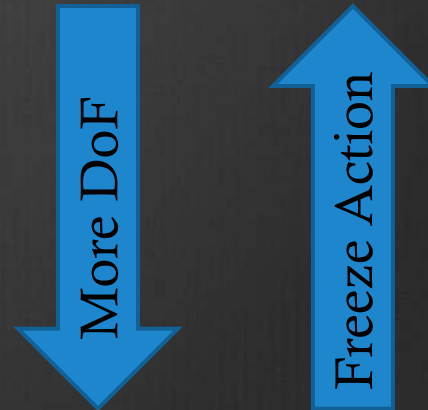


Review

- ⦿ Shutter speed – how long shutter is open.
 - A faster shutter speed freezes motion while a slower shutter speed blurs motion.
- ⦿ f/stop – the size of the lens opening.
 - A bigger opening (f/2) lets in more light and provides less depth of field than a smaller opening (f/16).
- ⦿ ISO – camera's sensitivity to light.
 - Larger numbers mean greater sensitivity to light but a decrease in quality.

Shutter Speed & Aperture Together

- Remember each upward full f/stop or each shutter speed step increase lets in *half* the previous amount of light.
- Changing one up and the other down a full step results in the same exposure.
- What changes is the depth of field and the ability to freeze the action. The following combinations all give the same exposure:
 - f/4 @ 1/500 of a second
 - f/5.6 @ 1/250 of a second
 - f/8 @ 1/125 of a second
 - f/11 @ 1/60 of a second



Shutter Speed & Aperture Together

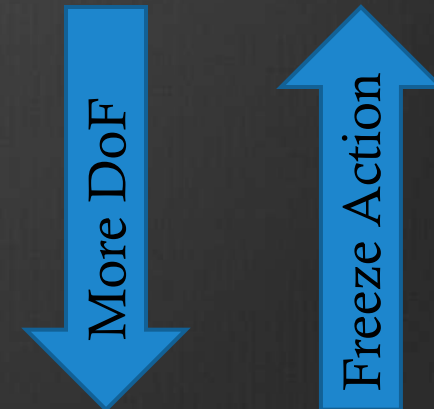
- Remember each upward full f/stop or each shutter speed step increases lets in $\frac{1}{2}$ the

Questions?

-
-
- to freeze the action. The following combinations

all give the same exposure:

- f/4 @ 1/500 of a second
- f/5.6 @ 1/250 of a second
- f/8 @ 1/125 of a second
- f/11 @ 1/60 of a second



Putting It Together

- ❁ By varying the f/stop, shutter speed and ISO we can tailor the exposure to give us the photograph we want.
- ❁ Goal: to freeze as much motion as possible with the background out of focus.
- ❁ Exposure: f/5.6 for 1/2,000 of a second and ISO of 800.



Putting It Together

- 🎥 Goal: maximize depth of field to get as much of flower in focus as possible.
- 🎥 Exposure: f/27, for 1/8 second, ISO 640.
- 🎥 Taken with a tripod.



Putting It Together

- 🎬 Goal: panorama with everything in sharp focus. Image is made from 4 shots stitched together.
- 🎬 Exposure: f/22 for 1/125 of a second, ISO 500.



Putting It Together

- 🎥 Goal: after sunset photo to show the stars and capture last of the sky's colors.
- 🎥 Exposure: f/5.6 for 30 seconds, ISO 400.



Putting It Together

- ❁ Goal: capture photo outside in evening using available dim incandescent light.
- ❁ Exposure: f/2.0 at 1/60 of a second, ISO 3,200.



Putting It Together

- ❁ Goal: adjust depth of field so only the face of the birds are in sharp focus.
- ❁ Exposure: f/5.6 at 1/500 of a second, ISO 640.



Putting It Together

- ❁ Goal: Max. depth of field and long exposure to show flowing water.
- ❁ Exposure: f/22, $\frac{1}{2}$ a second, ISO 100.



Putting It Together

🎥 Goal: photo of the Milky Way.

🎥 Exposure:
f/3.5 at
20 seconds
ISO 4,000.



Putting It Together

🎥 Goal: photo of the Milky Way.

🎥 Exposure:
f/3.5 at
20 seconds
ISO 4,000.



Questions?

Wide Angle & Telephoto

- 🎞️ The lens choice can impact the photo.
- 🎞️ A Telephoto lens magnifies the image, it pulls objects closer to you and compresses space. It also magnifies vibration and can result in blurred pictures.
- 🎞️ A Wide Angle lens is the opposite. It provides a broader field of view and makes everything seem further away from the camera.

Wide Angle & Telephoto



Wide Angle

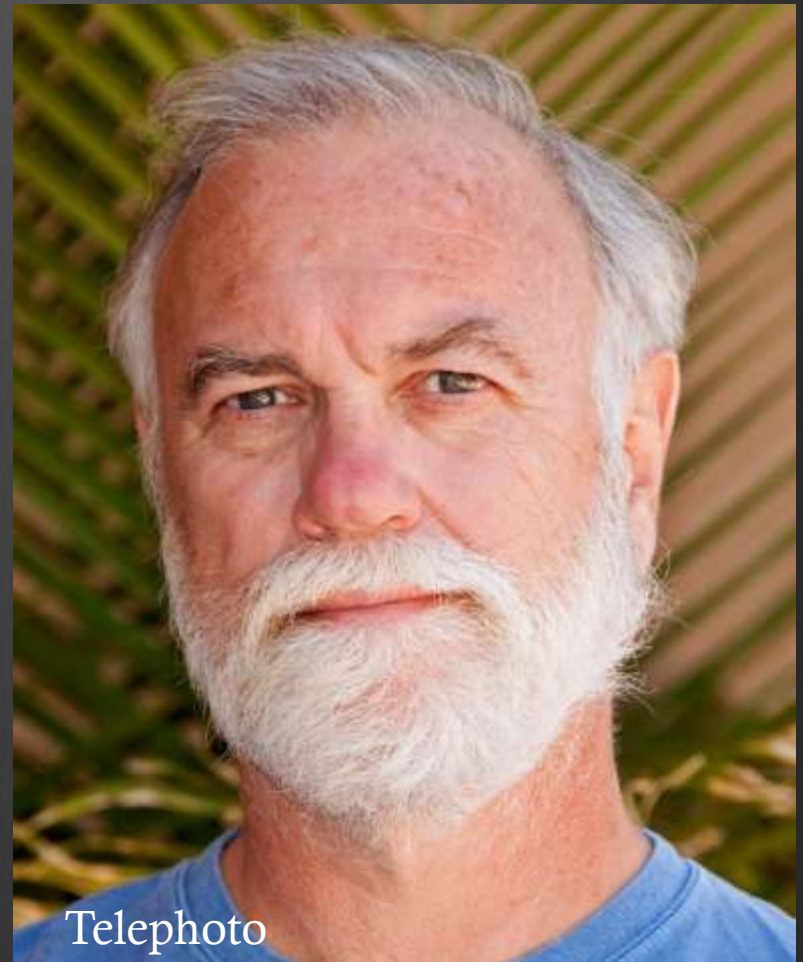


Telephoto

Both these photos were taken from the same spot. Note how the perspective and depth of the images look different.

Wide Angle & Telephoto

A wide angle lens can distort portraits. Using a moderate telephoto provides a better result.



Wide Angle & Telephoto

- 🎥 These two photos were from the same place.
- 🎥 In the third photo I moved so the NASA Rd. sign was the same size when I changed from a telephoto to a wide angle lens.



Wide Angle



Telephoto



Wide Angle

Wide Angle & Telephoto

Questions?



Wide Angle



Telephoto



Wide Angle

Image Data

Suppose I like this photo and want to be able to replicate the settings.



Image Data

- ❁ I could take detailed notes about the f/stop, shutter speed, ISO, exposure compensation, lens focal length, flash settings, blah, blah, blah....
- ❁ Or I could just look at that information and a lot more about the image each digital file contains.
- ❁ How to find and view it?

Image Data

1. Find the photo on your computer then right-click on the file.

2. Left-click on Properties in the menu box that comes up.

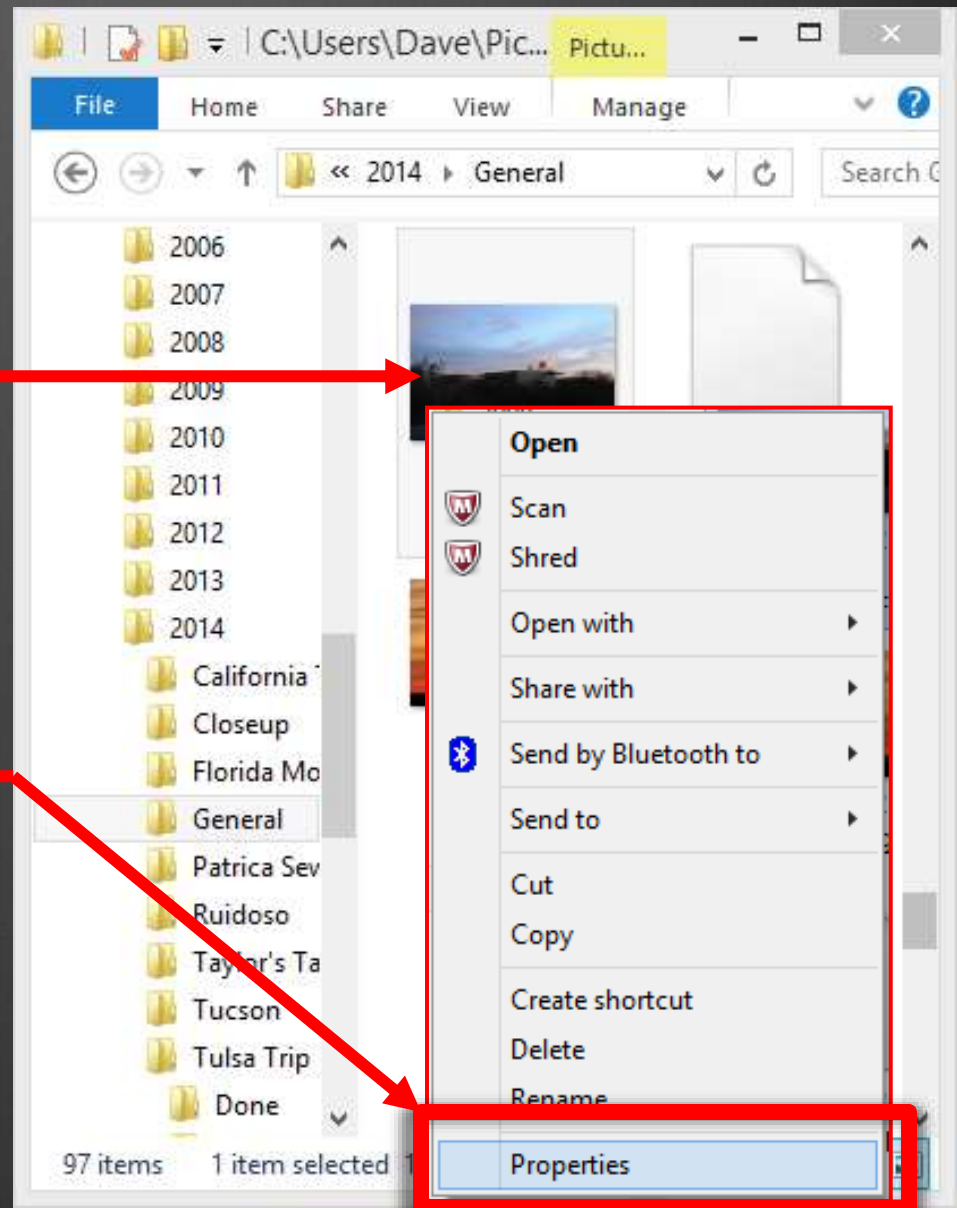


Image Data

4. In the **Properties** box that comes up click on the *Details* tab.
5. That will bring up information about the image.

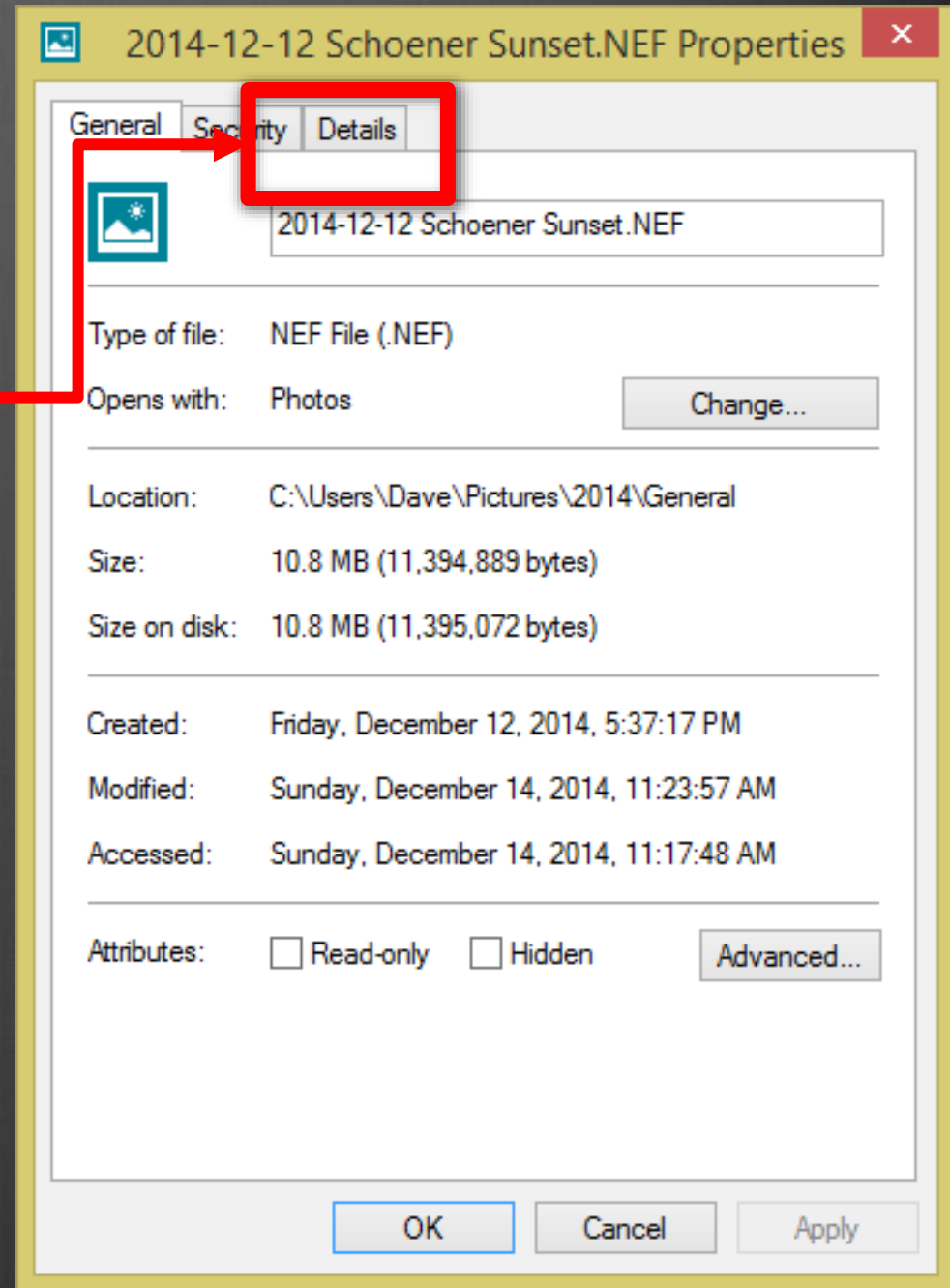


Image Data

- ❉ This is only a part of the data available.
- ❉ The data and order will vary but typically you will find this.

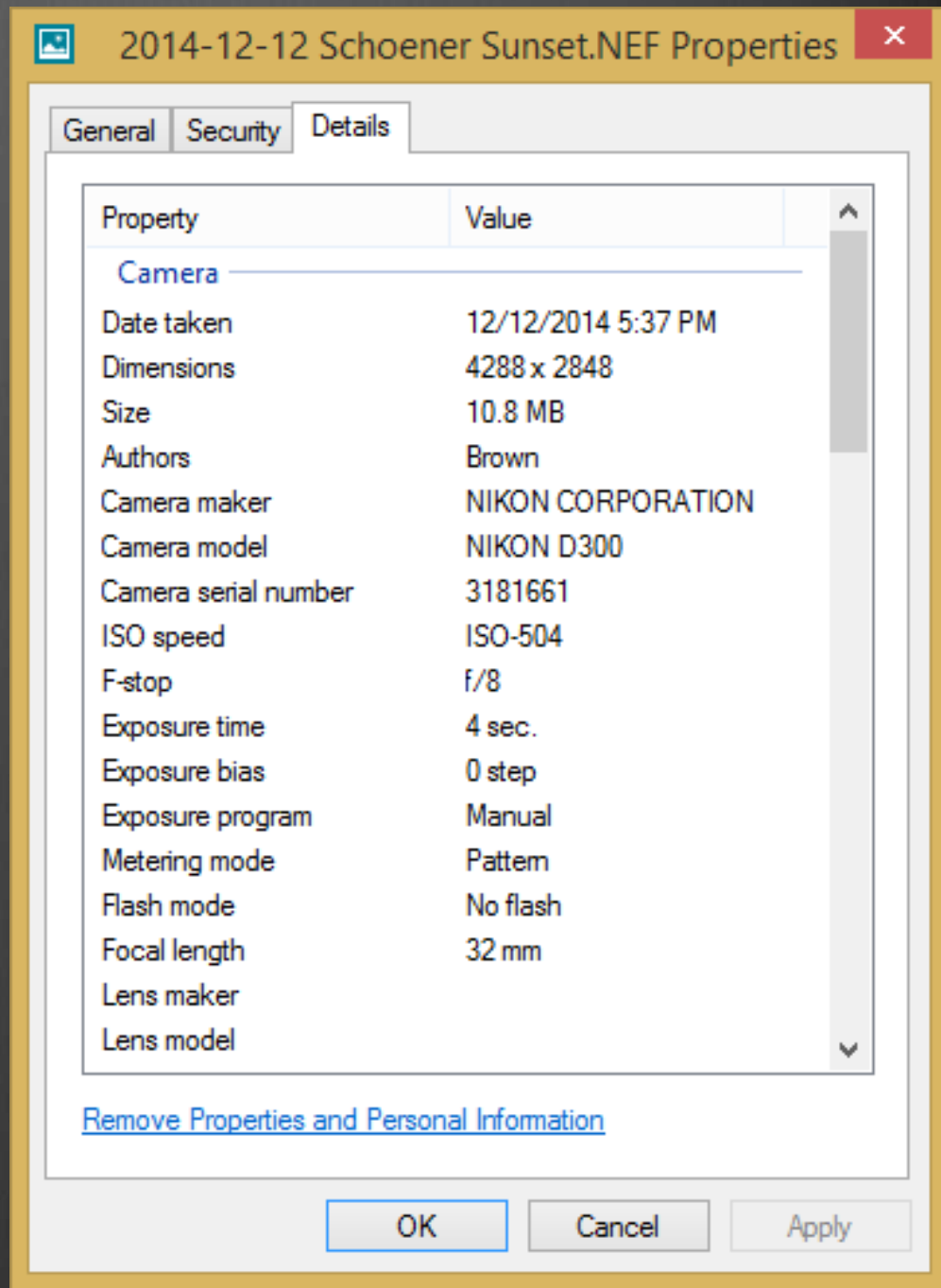


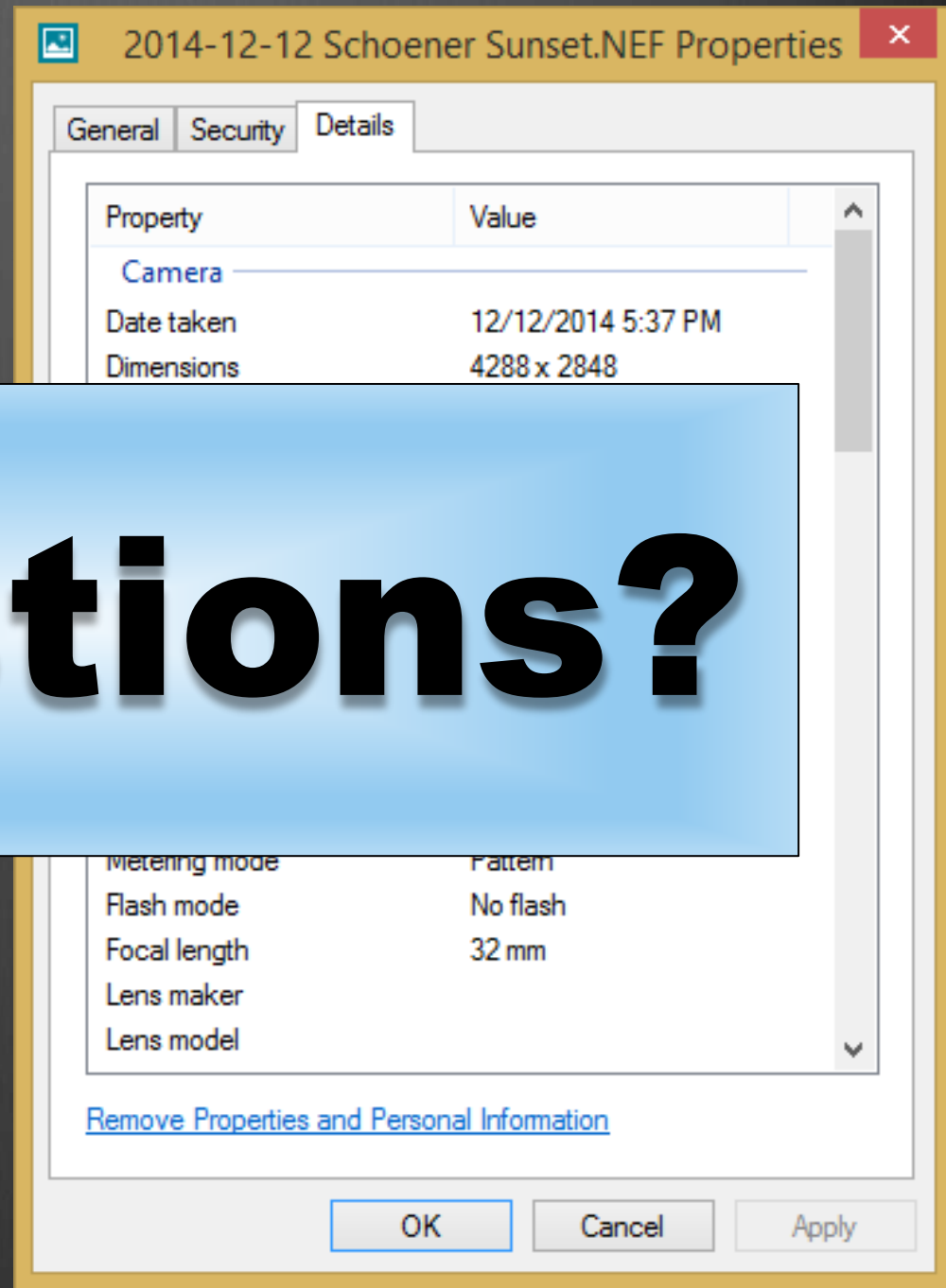
Image Data

⦿ This is only a

⦿

⦿

but typically you
will find this.



Shooting Assignments

1. See how different f/stops impact the depth of field. Isolate subject or have everything in focus.



2. Pick something in motion and see how the shutter speed impacts the sharpness of the image.

