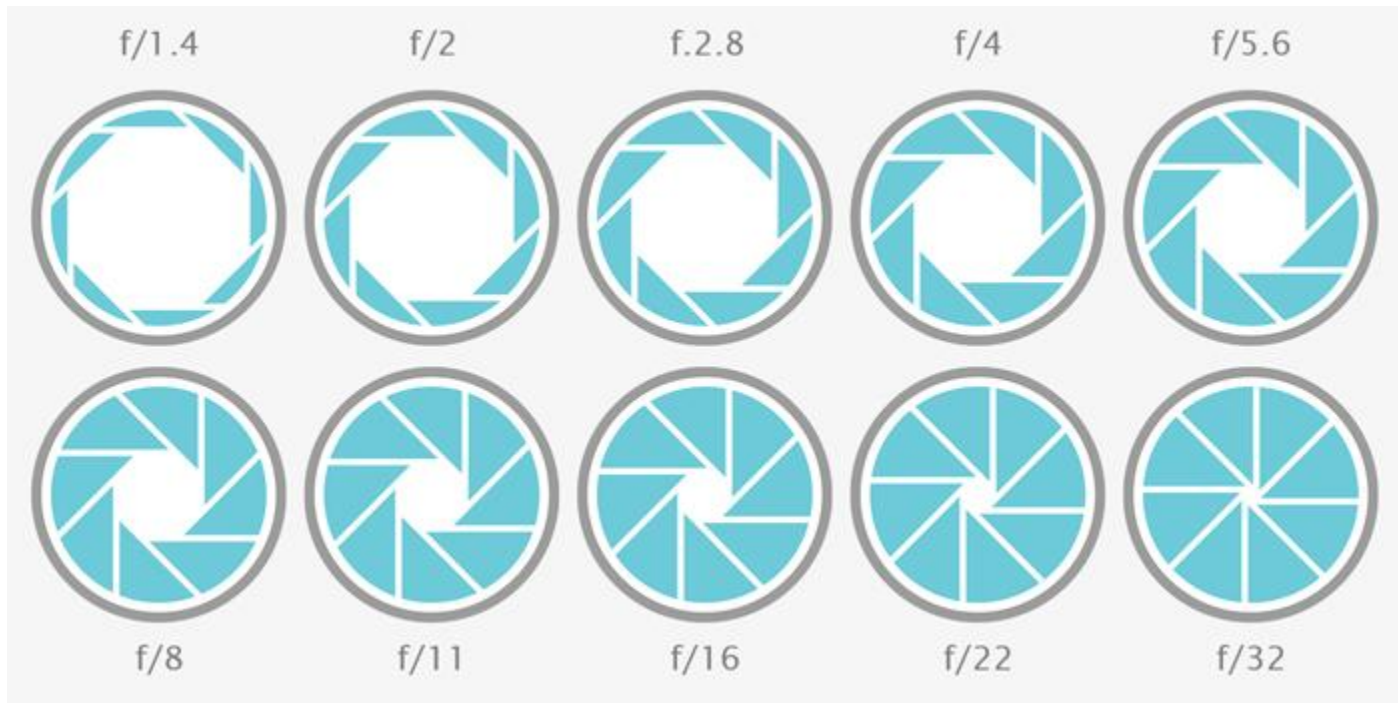


# Aperture

The size of source or light.

# How Aperture Works



# Shutter Speeds

- 1 Sec                      1/128 Sec
- $\frac{1}{2}$  Sec                      1/256 Sec
- $\frac{1}{4}$  Sec                      1/512 Sec
- $\frac{1}{8}$  Sec                      1/1024 Sec
- $\frac{1}{16}$  Sec                      1/2048 Sec
- $\frac{1}{32}$  Sec                      1/4096 Sec
- $\frac{1}{64}$  Sec                      1/8190 Sec

# ISO

- 100 High Resolution, Low Digital Noise
- 200 – 500 Mid Range Resolution Relatively low noise
- 600 to 1200 Decent resolution, noise usually visible
- Above 1600 Usually noisy and less resolution
- 3200 and above generally quite noisy and lower acutance.

# Resolution – File Size

- Small JPG
- Medium JPG
- Large JPG
- RAW (usually requires software to read)

# Shutter Preferred Mode

- In the shutter preferred mode the photographer selects the shutter speed based on need. The camera select the aperture based on the available light.
- Shutter speeds have requirements based on the amount of light and length of the lens. A “Rule of Thumb” is that the reciprocal of the focal length of the lens is the minimum shutter speed required.. 500mm=1/500<sup>th</sup> sec.

# Aperture Preferred Mode

- In this mode one selects the aperture based on desires and needs. (usually depth of field related). The larger the aperture (1.4, 2.0, 2.8) the shallower the depth of focus. The smaller the aperture (11, 16, 22) the larger the depth of focus. The amount of light necessary is the determining factor. The selected ISO determines the light entering the camera and hitting the sensor.

# ISO

- ISO is the sensitivity of the electronic sensors to the light. In the film days, this was called ASA. This is a numeric representation of the amount of light. It is a linear representation.
- ISO 200 is twice as sensitive as ISO 100, etc.
- ISO 100 has generally very high resolution and saturation of color. The higher the number, the lower the quality of the image.



# ISO cont'd.

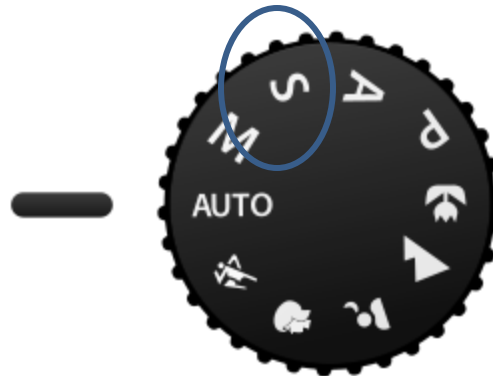
- Each new sensor seems to improve the resolution of the medium and the corresponding software is growing even faster.
- Cameras today can go up to 200000 ISO, but these numbers are stretching the viewable quality of image.
- Common sense and experience are the keys to good imaging.

# Imaging

- In the early days of color film, we had about four stops of dynamic range. These stops were F-Stops. Film progressed to about 5.5 to 6 stops.
- Digital started at about 5 stops and is now up to about 14 stops on the best sensors.
- Normal cameras have about 6 to 9 stops.
- Digital has far exceeded film at this point.

# Shutter Preferred

- This method allows the photographer to set the Shutter Speed and the camera sets the appropriate Aperture. This is good where the shutter speed can affect the focus and acuity of the image. Fast speeds for sports, slow speeds to show motion, intermediate speed for general shot.



# Shutter Speeds

- 1/Reciprocal of focal length is the minimum for longer lenses. Image Stabilization can help.
- Test yourself, but 1/60th of a second was considered hand held minimum.
- Blur shots generally are 1/8 second longer.
- Stopping action takes practice, panning and higher speed. Generally 1/250<sup>th</sup> and higher.

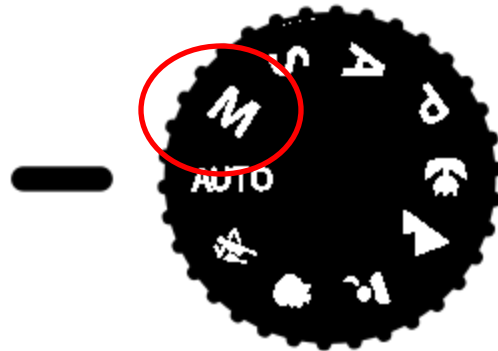
# Aperture Preferred



- In this case the Photographer selects the Aperture and the Camera selects the Shutter Speed.
- The smaller the Aperture (hole size) the shallower the depth of focus. F 1.4, 2.0, 2.8, etc.
- The larger the number, smaller the hole in the lens, the greater the depth of focus, F 11, 16, 22, ect.

# Manual Exposure

- Photographer sets shutter speed and aperture based on the light. Usually requires a light meter inside or outside of the camera. The old film boxes had general settings on the box.



# Manual Exposure

- In this case the Photographer selects BOTH the Aperture and the Shutter speed. This method gives the photographer total control of the output. A built in or external light meter should be used to calculate the settings. The old Kodak film boxes had a generic light meter method built in that Used the concept of “SUNNY 16.”

# Manual Exposure

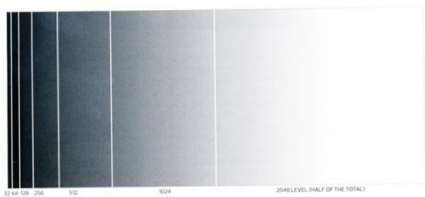
- Manual exposure has some great advantages in photographing moving images that are in front of light and dark backgrounds



# Outside Help

- Photographing special occasions like fireworks, shuttle launches, indoor sports, etc, can be studied by looking up the subject on the internet and getting opinions and then sample the ones for what suites you. Find an expert and pick their brains live or on the net.
- Keep a notebook and write down your results for future use.

# Light



*As the Sensor Sees in Digital*



*As the Eye Sees in Linear*

# The Rules of NERDS

- The more you shoot, the luckier you get.
- The frequency of “Happy Accidents” increases with more volume.
- If you keep notes and then refer to them, people will think you don’t know, but if you don’t, they’ll know you don’t have the answer.