

Aperture and Shutter Speed

Camera Basics

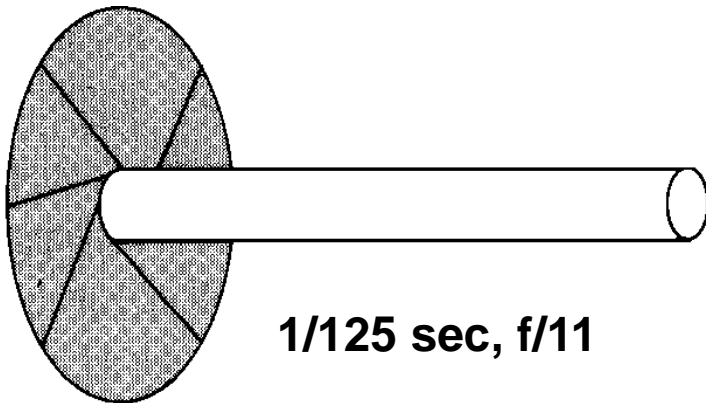
All cameras have three basic settings. They are:

- Shutter Speed
- Lens Opening
- Focus

To get a good picture, you need to adjust the shutter speed and the lens opening settings to control the amount of light entering your camera.

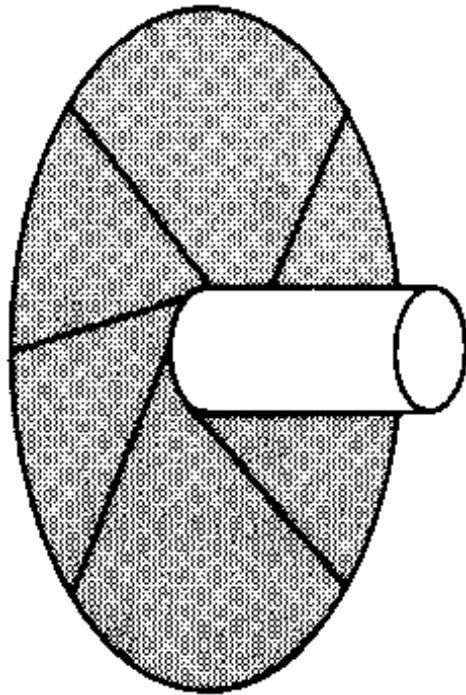
Shutter Speed

- The *shutter speed* controls the length of time the shutter will stay open to allow light to reach the film.
- A slow shutter speed lets light in to expose the film for a long time.



Shutter Speed

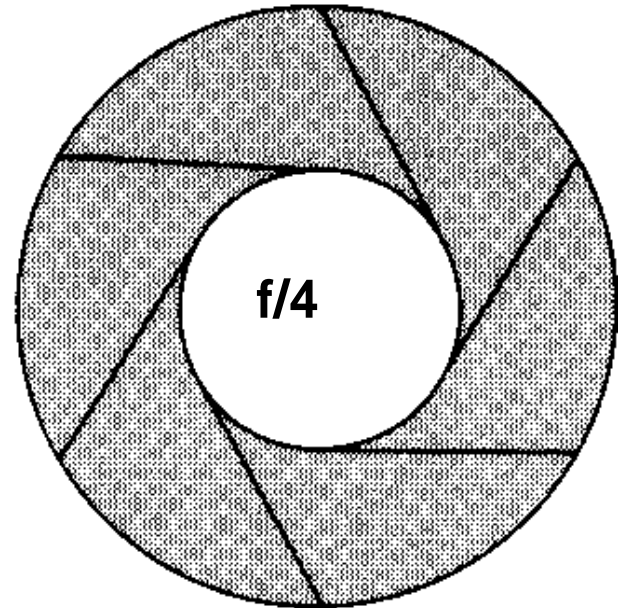
- A fast shutter speed lets light in to expose the film for a short time.



1/1000 sec, f/11

Lens Opening- Aperture

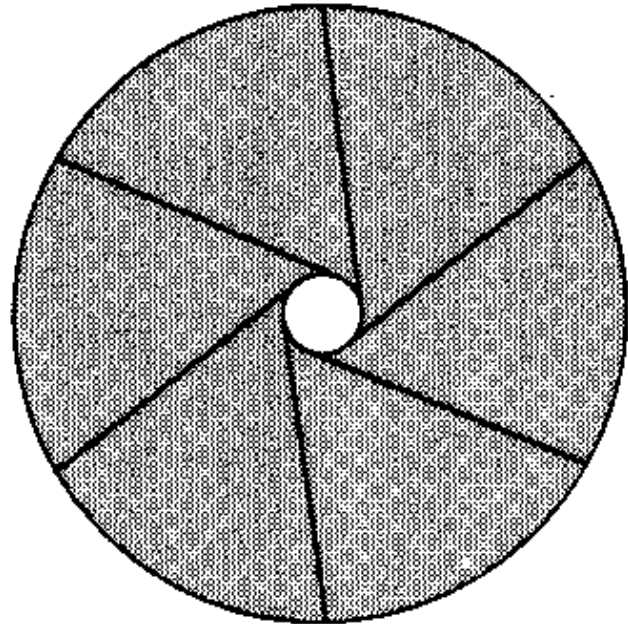
- The lens opening controls how much light will enter the camera while the shutter is open. A large lens opening lets in a lot of light.



Lens Opening- Aperture

- A small lens opening lets in a small amount of light.

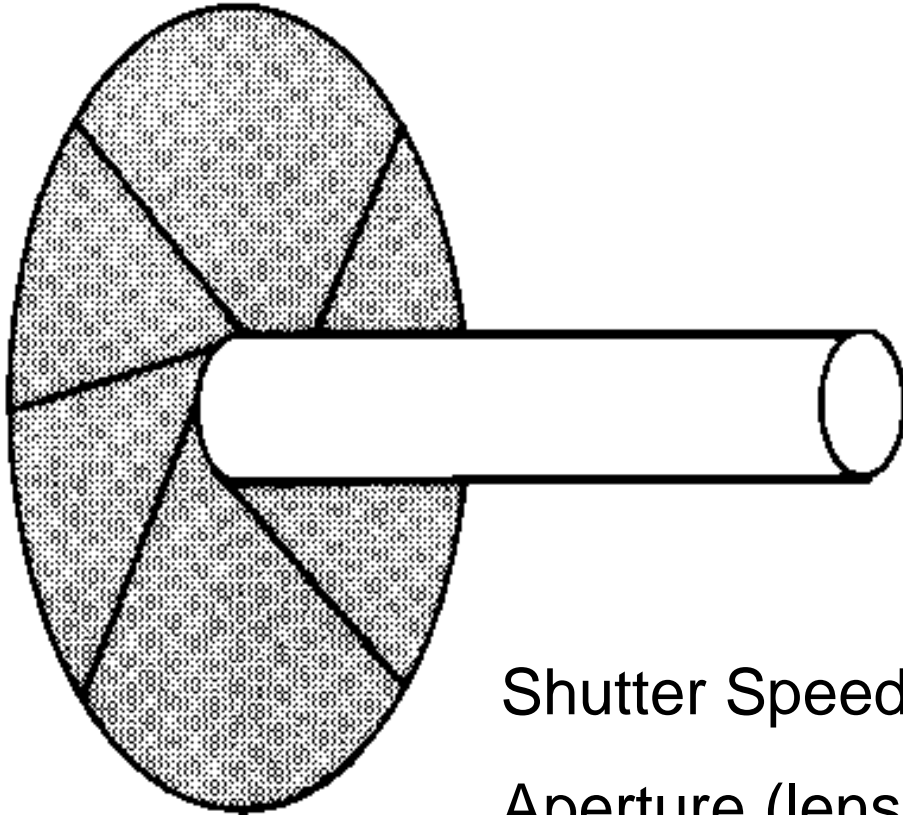
f/16



Taking Photos

To get good pictures, the film in your camera needs to be exposed to the same quantity of light for every picture.

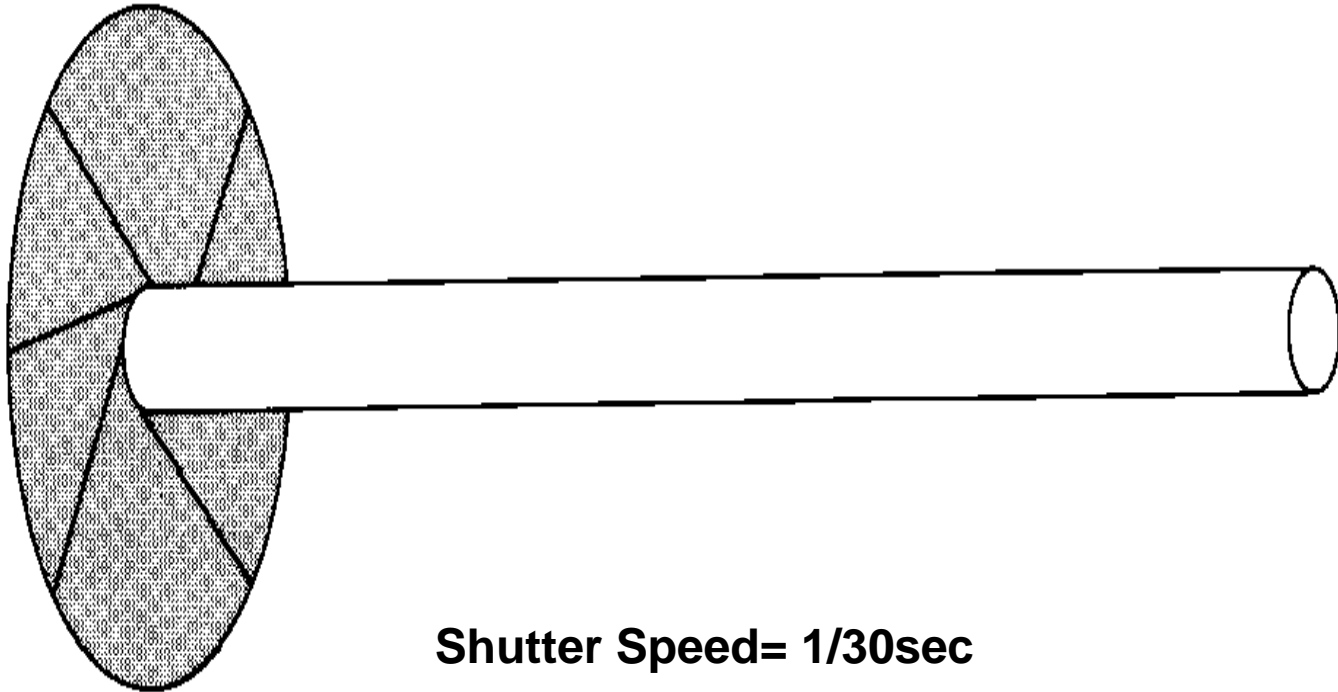
On a normal sunny day, you will use a fairly fast shutter speed and a medium lens opening so that the correct amount of light will reach the film and you will get a properly exposed picture.



Shutter Speed= $1/250$ sec

Aperture (lens opening)= $f/11$

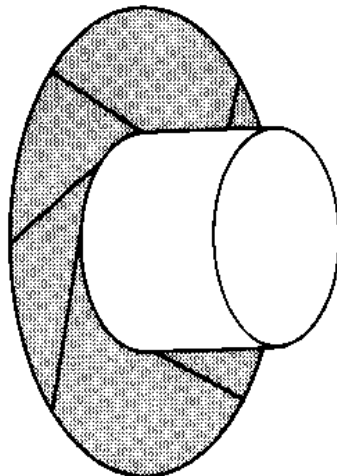
On a cloudy day, the light isn't as bright and you need to either let light into the camera for a long time...



Shutter Speed= 1/30sec

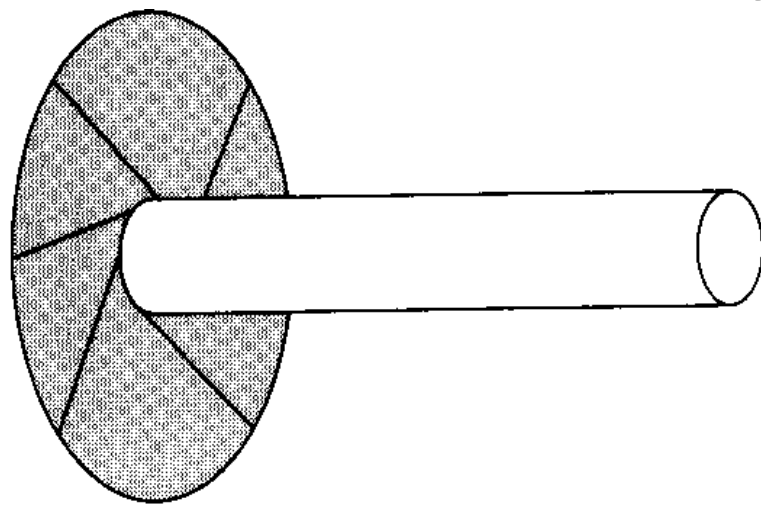
Aperture= f/11

or let in a lot of light for a shorter time.



Shutter Speed= 1/500 sec
Aperture= f/2.8

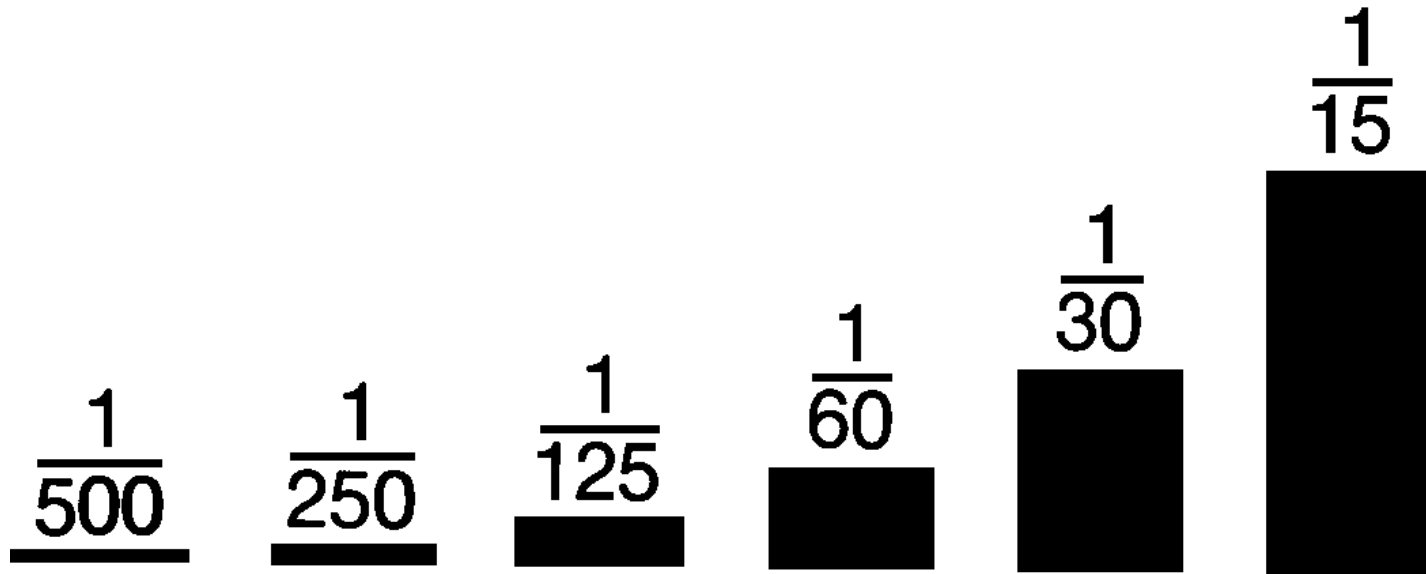
Or possibly both—a lot of light for a long time.



Shutter Speed= 1/60 sec
Aperture= f/8

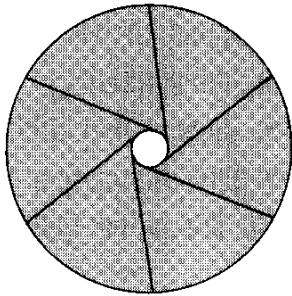
Shutter Speed Settings

Shutter speed settings are usually numbered 30,60,125, 250, 500—or on older cameras 25, 50, 100, 200. The numbers refer to fractions of a second, such as 1/30 or 1/500.

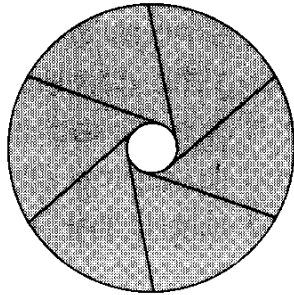


Aperture

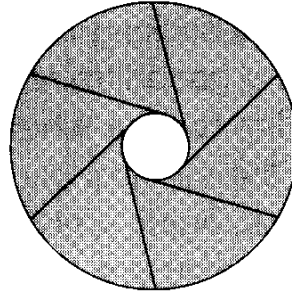
Aperture Settings are the size of the opening of the lens. They too are described by fractions.
(f/22, 16, 11, 8, 5.6, 4, 2.8)



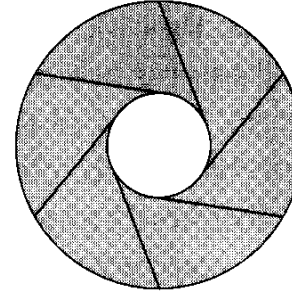
f/16



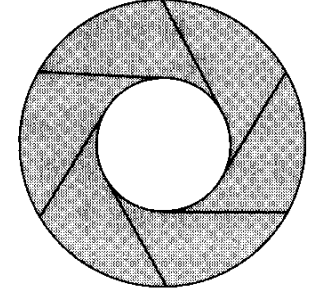
f/11



f/8



f/5.6



f/4

Exposure and your Light Meter

The light meter in your camera reads the amount of light going through the aperture and gives you an idea if there is too much light (over exposed), too little light (under exposed) or if everything is just right...

Effects of ISO on images:



ISO 1600

ISO 800

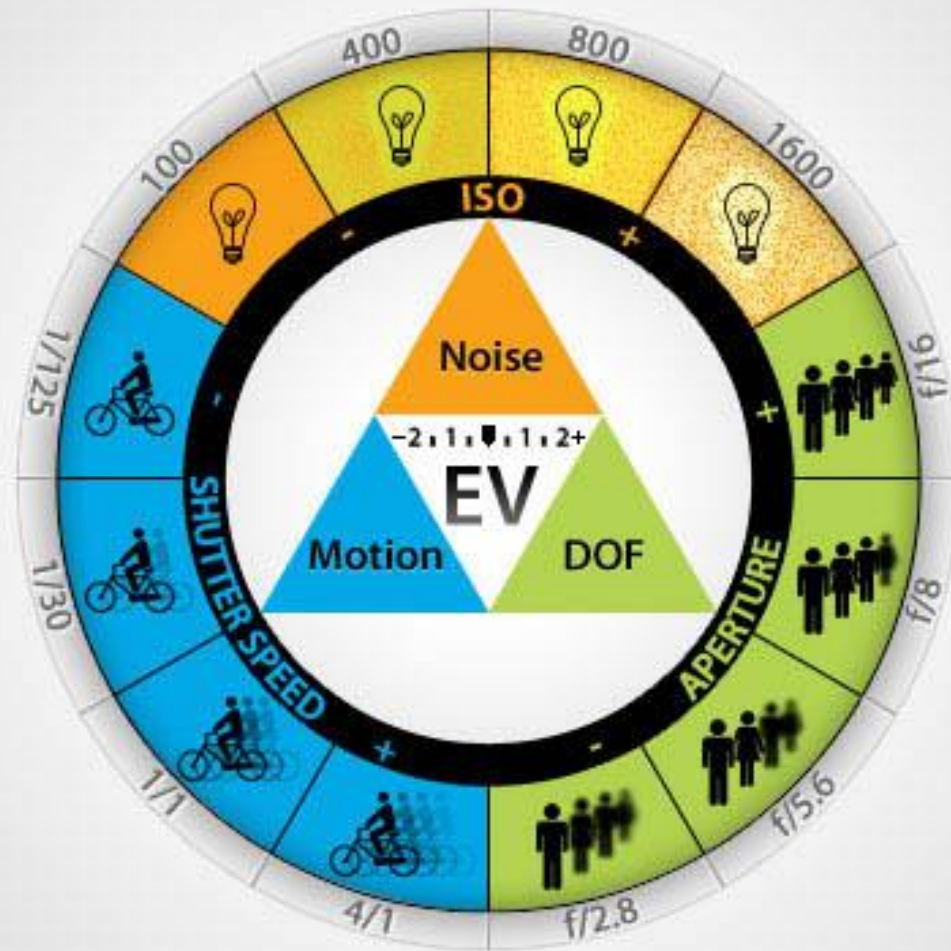
ISO 400

ISO 200

ISO 100

Overexposed / Noisy/grainy <<<<<<

>>>>>> Underexposed



Effects of shutter speed, aperture, and ISO on blur, depth of field, and noise



Wide depth of field (DOF)
Small Aperture (f11-f16+)



Medium depth of field (DOF)
Medium Aperture (f5.6-f8)

Shallow depth of field (DOF)
Wide Aperture (f2.8-f4)



Term	Definition	Application
Exposure	The process of letting light through the camera lens to illuminate (expose) the digital sensor and produce an image. A correct exposure is a happy medium where the subject is neither too dark (underexposed) or too light (overexposed).	Correct exposure is achieved by balancing the three elements of aperture, shutter speed, and ISO.
ISO	The ISO amplifies the signal that the sensor receives, making it more sensitive to light.	ISO can boost the amount of light in an image. Higher ISO helps compensate for loss of light when a smaller aperture or faster shutter speed is necessary. However, high ISO settings can result in noisy (grainy) images when a larger aperture is used.
Shutter Speed	An electronic or mechanical device that regulates the amount of light that is let in to expose the picture.	Faster shutter speeds allow in less light, can cause underexposure with small aperture settings, can capture fast moving objects clearly, and may require a higher ISO setting to compensate. Slower shutter speeds allow more light in, can cause overexposure with a wide aperture setting, tend to make moving images blurry, and require a lower ISO setting.
Aperture	A hole in the camera's lens (the "iris", like your eye) that allows the light to pass through the sensor.	Smaller apertures let in less light, are denoted by a higher F#, and provide a wider depth of field, causing more of the image to be in focus. Larger apertures let in more light, have a lower F#, provide a shallower depth of field, making backgrounds blurry.