

EXPOSURE 101: Aperture, Shutter Speed and Iso

Western Wisconsin Photography Club

March 7, 2012



**Photography is about
capturing light.**



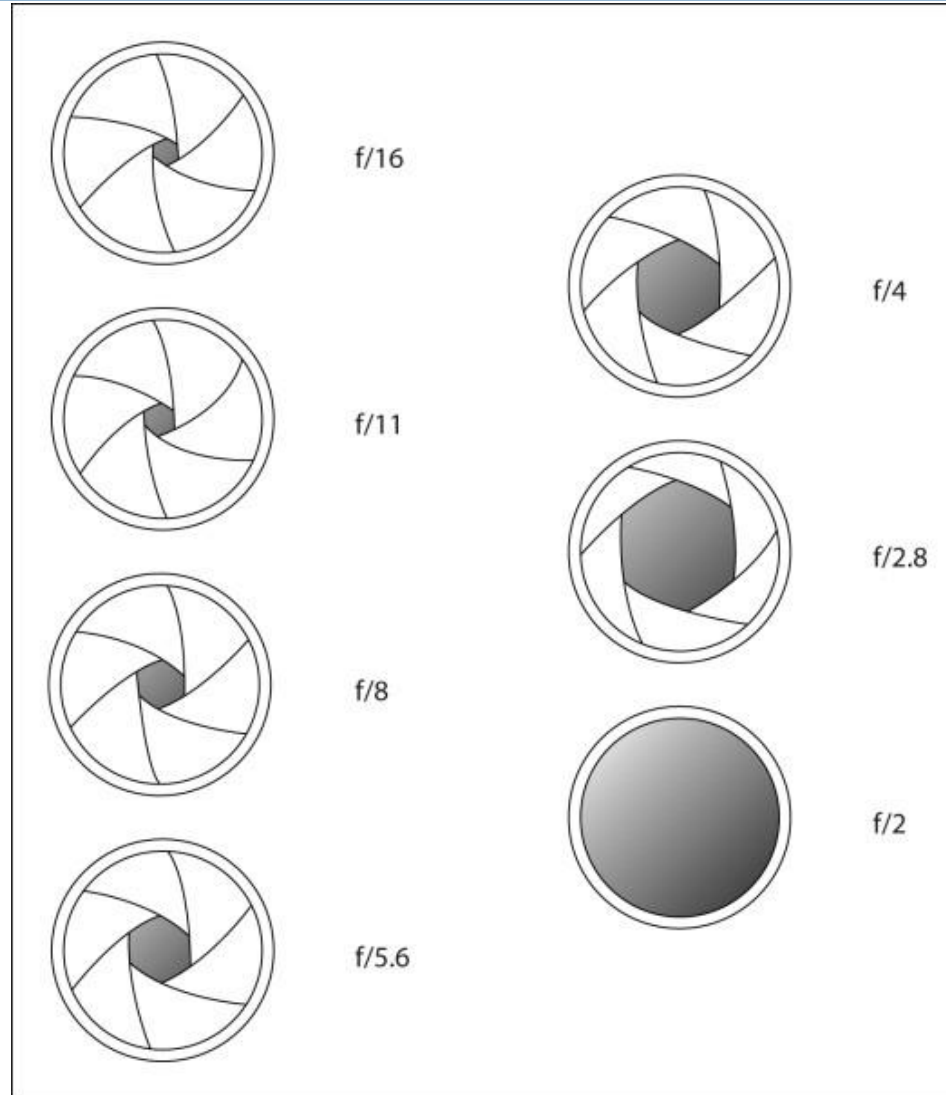
**Photography is about
capturing light.**

**Aperture, shutter and ISO affect the
light the camera sees.**

APERTURE

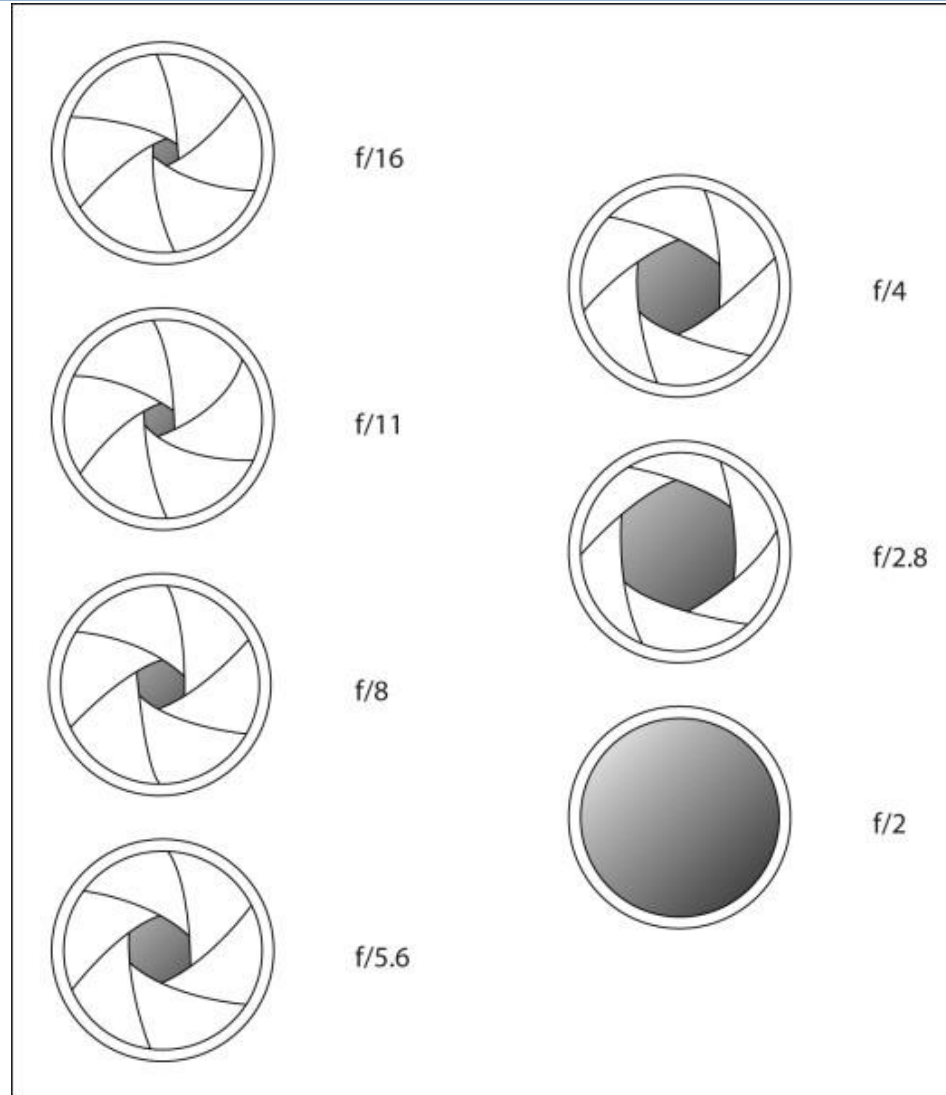
- Aperture is the size of the opening between the lens and the film or sensor.
- Aperture is measured in f-stops.
- F-stop measurement is inverse to the opening size.
 - Small openings have large f-stop number.
 - Large openings have small f-stop number.

APERTURE



APERTURE

One full f-stop change exposes the film or sensor to double (or half) the light



Shutter Speed

- Shutter speed is the length of time the film or sensor is exposed to light.
- It is how long the camera's "eye" is open.
- It is measured usually in fractions of a second.
 - Fast shutter speeds expose the film or sensor to less light.
 - Slow shutter speeds expose the film or sensor to more light.

Shutter Speed

□ Standard shutter speeds:

- $1/1000$ s
- $1/500$ s
- $1/250$ s
- $1/125$ s
- $1/60$ s
- $1/30$ s
- $1/15$ s
- $1/8$ s
- $1/4$ s
- $1/2$ s
- 1 s

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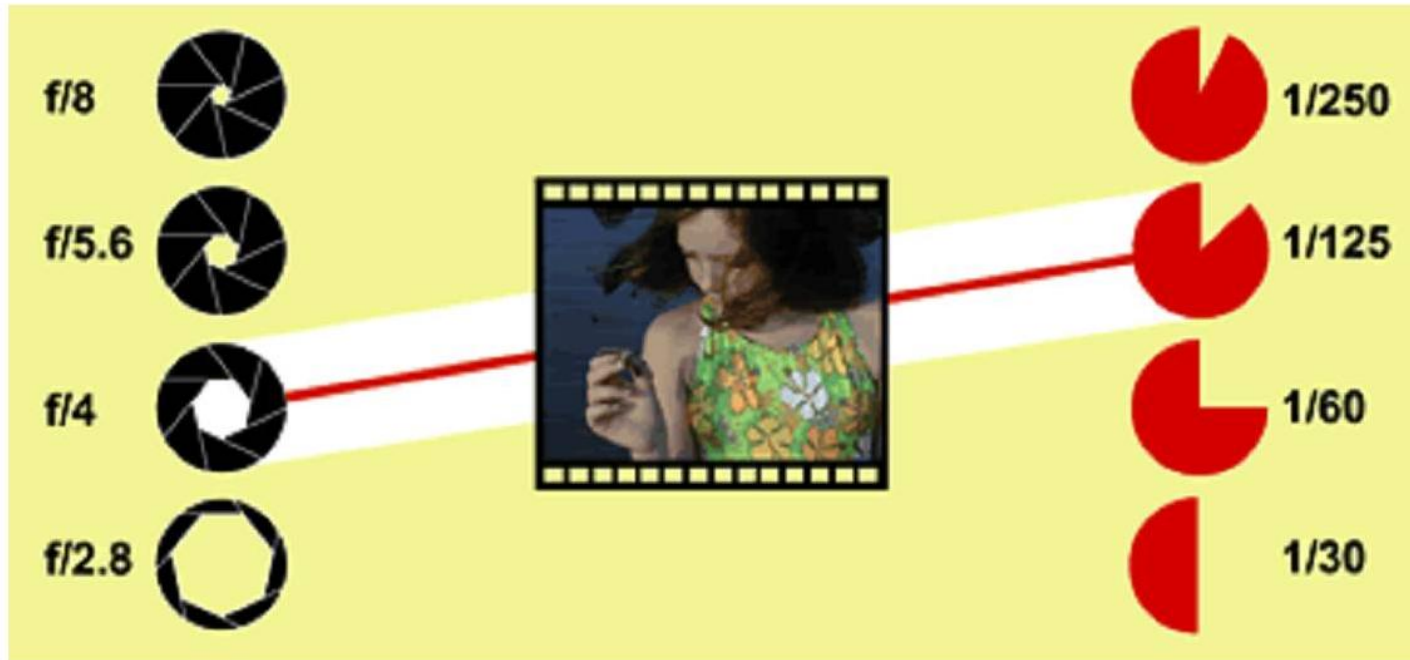
One shutter step
exposes the film
or sensor to
double (or half)
the light

Aperture and Shutter Speed

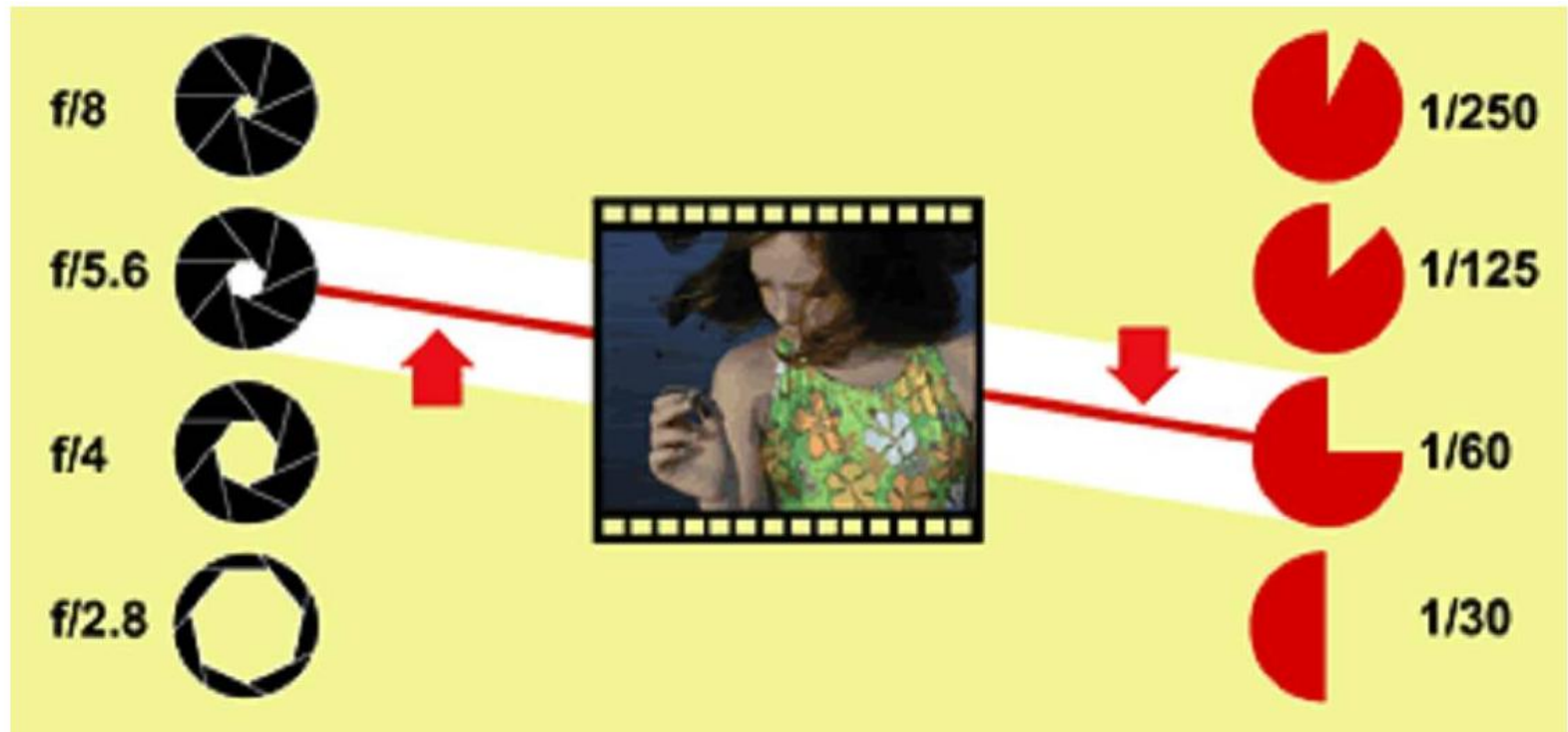
Striking the Right Balance

- The correct exposure of light balances aperture and shutter speed.
- See-saw analogy – where one end rises, the opposite end falls by an equal amount.

Aperture and Shutter Speed Striking the Right Balance



Aperture and Shutter Speed Striking the Right Balance



ISO

- International Standards Organization.
- Uniform measurement system for sensitivity of digital camera sensors.
- Similar to film speed.
- Low ISO means sensor is less sensitive to light.
- High ISO means sensor is more sensitive to light.

ISO

- Standard ISO speeds:

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

ISO

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Full step change in ISO doubles (or halves) the sensitivity of the sensor.

ISO

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- 200
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- 6400

Equivalent to step change in the shutter speed or the aperture.

Effects of Aperture, Shutter Speed and ISO besides regulating amount of light

- Aperture: Controls the depth of field.
- This is the range of distance that will appear sharp in the image.
 - Small aperture (high f-stop value) results in a deep depth of field.
 - Large aperture (low f-stop value) results in a shallow depth of field.

Effects of Aperture, Shutter Speed and ISO besides regulating amount of light

- **Shutter Speed:** Controls the depiction of motion in the image.
 - Fast shutter speed freezes the motion of the subject.
 - Slow shutter speed blurs the motion.

Effects of Aperture, Shutter Speed and ISO besides regulating amount of light

- ISO: Involves varying levels of grain or noise in the image.
 - High ISO results in higher amounts of visible grain or noise visible in the image.
 - Low ISO results in minimal amounts of visible grain or noise visible in the image.

Camera Simulators

- www.photonhead.com/simcam
- www.camerasim.com/camera-simulator