

# Camera Basics

Learn to control your image-making

# Topics Covered

- Image Quality
- White Balance
- Metering Modes
- Servo Modes
- Picture-Taking Modes
- Exposure
- ISO
- Aperture
- Shutter Speed
- Depth of Field
- Exposure Modes
- Light Meter
- Digital Flash Modes

# Image Quality

Quality: Set to highest quality JPEG or Raw if the camera allows. JPEG is a good starting point.

- JPEG is a compressed file with a loss of information in the image, as the camera makes decisions about what is going to create a good image
- RAW is a “lossless” format, that has a much larger file size and usually requires additional editing to enhance the raw image

# White Balance (WB)

**White balance (WB)** is the process of removing unrealistic color casts, so that objects which appear white in person are rendered white in your photo.

Proper camera white balance has to take into account the "color temperature" of a light source, which refers to the relative warmth or coolness of white light.

**Color temperature** is a way of measuring the quality of a light source. It is based on the ratio of the amount of blue light to the amount of red light, and the green light is ignored. The unit for measuring this ratio is in degree Kelvin (K).

## Samples



Incorrect white balance



Correct white balance

# White Balance Settings



Auto White Balance - this is where the camera makes a best guess on a shot by shot basis. You'll find it works in many situations but it's worth venturing out of it for trickier lighting. Auto White Balance – I recommend for most instances.



Daylight - not all cameras have this setting because it sets things as fairly 'normal' white balance settings.



Cloudy - this setting generally warms things up a touch more than 'daylight' mode.



Tungsten -this mode is usually symbolized with a little bulb and is for shooting indoors, especially under tungsten (incandescent) lighting (such as bulb lighting). It generally cools down the colors in photos.



Fluorescent - this compensates for the 'cool' light of fluorescent light and will warm up your shots.



Shade - the light in shade is generally cooler (bluer) than shooting in direct sunlight so this mode will warm things up a little.

There are two custom white balance settings as well.

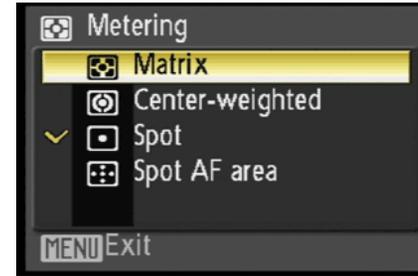


Custom



Kelvin

# Metering Modes



Cameras usually have at least three metering modes.

**Evaluative/Matrix:** The meter measures the entire scene and is a good option in general.

**Center Weighted:** Center weighting will concentrate more on what is in the center of the frame (60%-80%) rather than what is outside the frame.

**Spot Metering:** Measures a very small area in the center of the frame (1%-5%) and is very accurate when you need to expose for a specific part of your picture and care less about the other parts.

# Servo Modes



*The servo mode selector switch is on the front of the camera, underneath the lens release button.*

- C** – (sometimes called continuous servo) is good use when photographing moving objects. When your camera is set to AF-C and you focus on a moving subject, for example a dog running towards you, the focus will stay on the animal so long as your shutter button is held half way down. In other words, the camera will keep re-focusing as the animal moves. That is, so long as you keep your shutter button held half way down.
  
- S** - (AF single, sometimes called single area AF) mode, is good for photographing subjects that don't move, such as flowers or portraits etc. It locks the focus on the non moving object that you want to photograph. You can then recompose the shot and take the photograph.
  
- M** – (manual focus) mode. It's unclear why this focus mode is included, because nowadays there is usually an option to switch between auto and manual focus on the side of the actual lens. Maybe it's in case you come across a lens that doesn't give you that option.

# Picture-Taking Modes



Entry level cameras often have little or no manual controls, but almost all of them come with some forms of scene modes that are designed to help you get the best shots under certain specific shooting conditions.

Auto mode tells your camera to use it's best judgement to select shutter speed, aperture, ISO, white balance, focus and flash to take the best shot that it can. With some cameras auto mode lets you override flash or change it to red eye reduction.

# Picture-Taking Modes



## Portrait

The camera will automatically select a large aperture (small number) which helps to keep your background out of focus (ie it sets a narrow depth of field – ensuring your subject is the only thing in focus and is therefore the centre of attention in the shot). Portrait mode works best when you're photographing a single subject so get in close enough to your subject (either by zooming in or walking closer)



## Landscape

This mode is almost the exact opposite of portrait mode in that it sets the camera up with a small aperture (large number) to make sure as much of the scene you're photographing will be in focus as possible.



## Macro

Macro mode lets you move your closer into your subject to take a close up picture. It's great for shooting flowers, insects or other small objects.

# Picture-Taking Modes



## Sports

It is ideal for photographing any moving objects including people playing sports, pets, cars, wildlife etc. Sports mode attempts to freeze the action by increasing the shutter speed.

## Night

Night mode (a technique also called 'slow shutter sync') is for shooting in low light situations and sets your camera to use a longer shutter speed to help capture details of the background but it also fires off a flash to illuminate the foreground (and subject).

## Movie

This mode extends your digital camera from just capturing still images to capturing moving ones. Most new digital cameras these days come with a movie mode that records both video but also sound.

# Exposure

The exposure is the amount of light received by the film or sensor.

There are three main factors in the camera that determine the exposure:



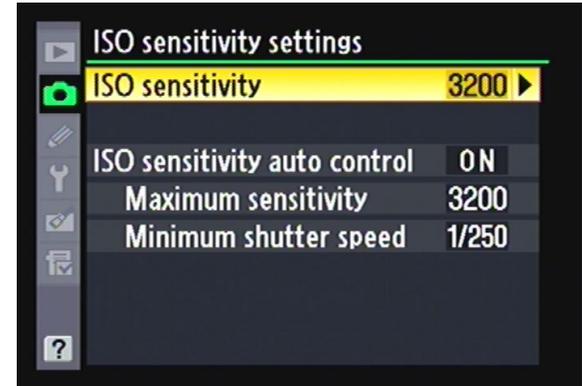
The sensitivity of the film or sensor (ISO).

How wide you open the lens diaphragm (aperture)

How long you keep the film or sensor exposed (shutter speed).

*These three elements are perhaps the most important concepts in photography and they can do a lot to change the look of your photo.*

# ISO



Digital cameras have an ISO rating indicating their level of sensitivity to light.

The sensitivities can range from:

50, 100, 200, 400, 800, 3,200, and 6400 on high-end digital SLRs.

When increasing the sensitivity, less light is needed to achieve a proper exposure.

Unfortunately this also amplifies the grain and the undesired noise.

# How to choose the ISO



Here are some general guidelines to begin:

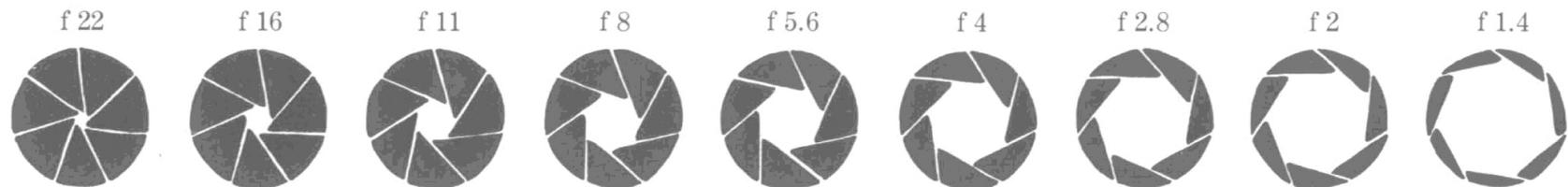
- 25-200 on a bright sunny day
- 400 on a cloudy
- 800-1600 at twilight
- 3200-6400 in a dark bar

# Aperture

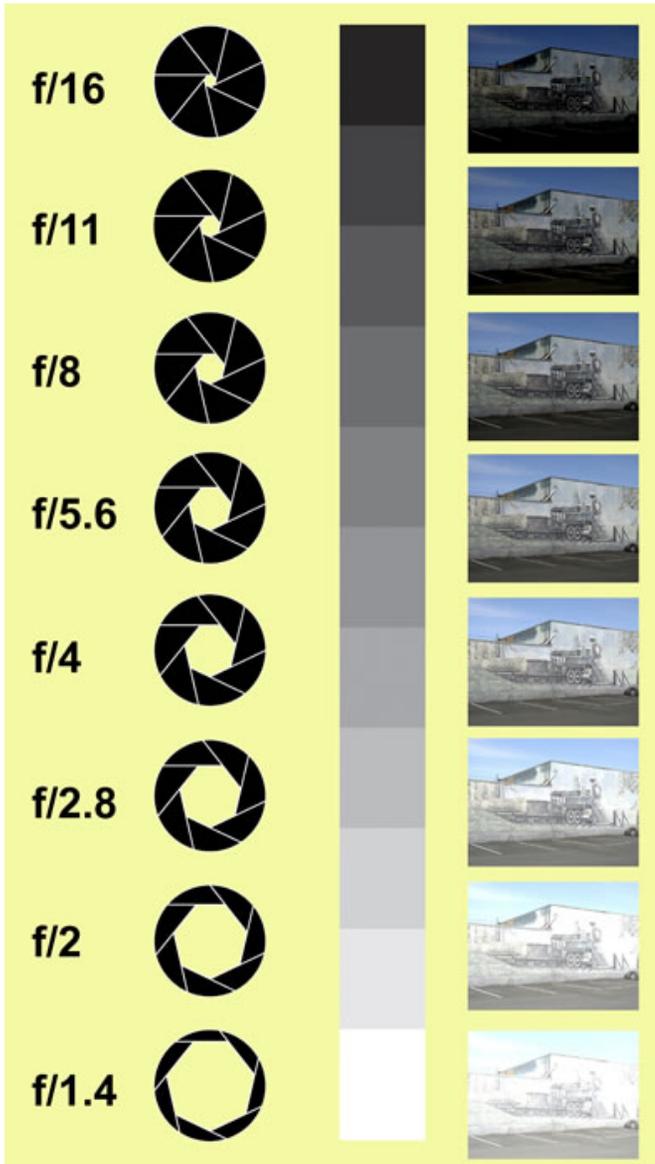
Aperture (f-stop) refers to the size of the opening in the lens that determines the amount of light falling onto the film or sensor.

The smaller the aperture opening, the less amount of light entering the lens.  $f/22$  ( $1/22$ ) which is a narrow opening.

The larger the opening the more light entering the lens.  $f/1.4$  ( $1/1.4$ ) which is a wide opening.



# Aperture



Each f-stop lets in half as much light as the next larger opening and twice as much light as the next smaller opening.

If you go from f-1.4 to 2, twice as much light enters through the lens.

This corresponds to a decrease of the pupil and aperture diameters by a factor of or about 1.414, and hence a halving of the area of the pupil.

Modern lenses use a standard f-stop scale, which is an approximately geometric sequence of numbers that corresponds to the sequence of the powers of the square root of 2: f/1, f/2, f2.8, f/5.6, f/8, f/11, f/16, f/22 etc.

# Shutter Speed

Shutter speed is the amount of time the shutter is held open when taking a photograph. It allows light to reach the film or imaging sensor (in a digital camera) for a set period of time.

Shutter speed is measured in seconds and similar to aperture, each full shutter speed time halves or doubles the amount of incoming light.

1       $\frac{1}{2}$        $\frac{1}{4}$        $\frac{1}{8}$        $\frac{1}{15}$        $\frac{1}{30}$        $\frac{1}{60}$        $\frac{1}{125}$        $\frac{1}{250}$

*The numbers are full stops indicating fractions of a second, which means that 125 is actually a 125th of a second and 2 is half of a second.*

# Depth of Field

How much of the space between your camera and the horizon, or "infinity," will be in focus in your photograph?

- The smaller the aperture (f16-f22), the greater the area that will be sharp. Good for landscapes.
- The larger the aperture, (f2.8-4) the less depth of field and less is in focus. Good for portraits.



Deep depth of field. Everything in focus. f/22



Shallow depth of field. Foreground and background out of focus. f/2.8

# How to choose Aperture & Shutter Speed?

You're always balancing camera or subject movement against depth of field because a change in one causes a change in the other.

## **When Depth of Field is important, set the Aperture first.**

- For maximum depth of field, with the entire scene sharp from near to far, you need a small aperture. (f/22)
- For shallow depth of field, to blur the background, you need a large aperture. (f/2.8) Shutter speed changes the way movement appears in the picture.

## **When capturing a moving object, set your shutter speed first.**

- Very short shutter speeds are used to freeze fast-moving subjects, for example if you want to stop action your child jumping in mid air. (1/1000 and above)
- Very long shutter speeds are used to intentionally blur a moving subject for artistic effect like capturing the movement of the wheels on a bicycle. (setting depends on how fast the wheels are moving.)
- For general shooting you need a medium shutter speed (1/60 sec. or faster) and a medium aperture (f/5.6 or smaller).

# Exposure Modes

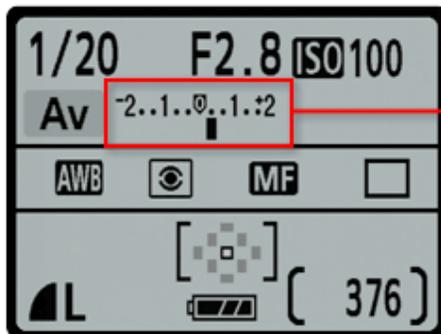


- **Fully Automatic** (green box) mode sets the shutter speed and aperture.
- **Programmed (P)** mode lets you select a few settings, such as ISO and flash. The camera then sets the aperture and shutter speed for these situations.
- **Aperture priority** (aperture preferred AV or A) mode lets you select the aperture (lens opening) needed to obtain the depth of field you want and the exposure system automatically sets the shutter speed to give you a good exposure. You select this mode whenever depth of field is most important.
- **Shutter priority** (or shutter priority, S or TV) mode lets you choose the shutter speed you need to freeze or deliberately blur camera or subject movement and the camera automatically sets the aperture to give you a good exposure. You select this mode when portraying motion is most important.
- **Manual (M)** mode lets you select both the shutter speed and the aperture.
- **Program Scene Modes** (Icons for portrait, sports, flower close-ups. ) The camera makes adjustments based on your subject matter, i.e. a fast shutter speed for sports, etc.

# How much light do I need?

In order to determine the exposure for a given subject, the light that reflects from the subject has to be measured with a light meter.

Consumer digital SLR cameras have a light-meter in the camera. In most cases you want your lighter meter to fall at zero.



The light meter.  
Note that it goes from  
-2 stops to +2 stops

Any increment over 0, i.e. between 0 and +2 will cause your image to be overexposed (too light).

Any increment under 0, i.e. between 0 and -2 will cause your image to be underexposed (too dark)



This light meter reads the image will be underexposed by almost one stop.

*For a correct exposure, measure something that is not too light or not too dark or your light meter reading will be skewed.*

# Digital Flash Modes



Automatic mode — Flash triggers automatically when the camera determines more light is needed in a scene. Turn off this mode in places that forbid inside flash photography such as museums.



Red-eye reduction — Fires the flash several times just prior to exposing a photo. Reduces the reflection in a subject's eyes that causes red-eye. The rapid flashes cause a subject's pupils to contract and helps minimize the red-eye effect. Inform subjects before using this mode as the pre-flashes can cause people to look startled.



Forced (fill-in) flash — Keeps the flash on in situations where automatic mode would keep it off. Used when additional illumination is needed, such as when the main source of light is in the back of a subject or shadows prevent details from showing. Can be effectively used outside when subjects are within the flash range. Suppressed flash — Turns the flash off.



Slow sync (also called night scene)\* — Use to capture a dimly lit background at night. The flash fires briefly to light the foreground subject.



Rear-curtain sync\* — Similar to slow sync but flash doesn't fire until right before the shutter closes.



Flash exposure compensation — Used to increase or decrease the output of the flash; not all digital cameras have this feature.



No Flash — Disables the flash on your camera.

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