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### What is photography

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- The word Photography is originally a greek word so it has the same meaning in greek. It consists of two words put together "photo" which derives from "phos" and it means "light" in english, and graphy, which probably derives from graphi , which can mean write or drawing. The exact form in greek is **φωτογραφία** (fotografia)
- Photography is the process of recording an image - a photograph - on light sensitive film or, in the case of digital photography, via a digital electronic or magnetic memory.

*"Photography, by definition, is to draw with light or to make an image with light onto a surface."*

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### The basic elements of photography

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- Exposure
- Focus
- Composition
- Colour/Monochrome

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## The basic elements of photography

### • Exposure

Exposure is the overall brightness or darkness of a photograph. More specifically, it's the amount of light that reaches the camera sensor when a picture is being taken. The more you expose the camera sensor to light, the lighter your photo will be. The less light, the darker your photo will be.

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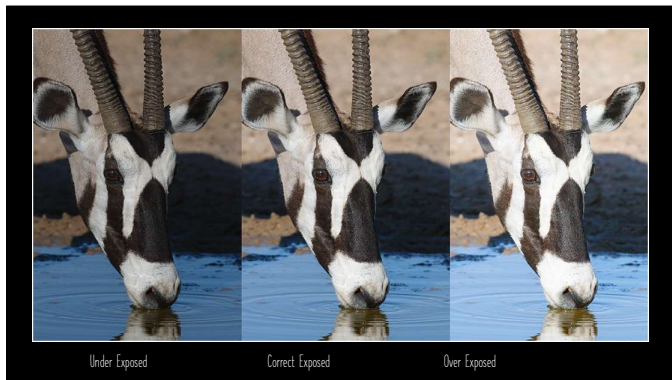
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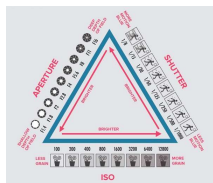
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## How do we determine correct exposure?

• There are three ways for a camera to control the amount of light that reaches the camera sensor, these three together constitute the exposure triangle:

- ISO
- Shutter speed
- Aperture



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## What is ISO?

ISO originally referred to the sensitivity of film—its "light-gathering" ability. The higher the ISO rating, the greater the film's ability to capture images taken in low light. High ISO film was called fast film—it required a shorter exposure than a low ISO film. For digital photography, ISO refers to the sensitivity—the signal gain—of the camera's sensor.



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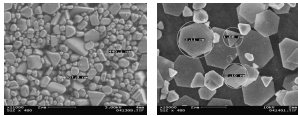
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## Noise vs Grain

Film grain, or granularity, is the texture of the photo-chemical crystals suspended in the plastic film. Those crystals had different sizes and random yet type- and speed-specific arrangements that would give each film type a certain look and feel.



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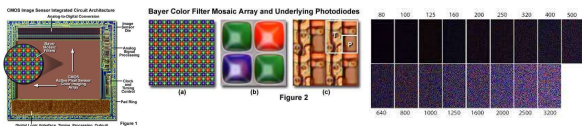
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## Noise vs Grain

In digital sensors, there is no variation in the photo-sensitive silicon diodes. Each one is a small rounded rectangle in a nearly perfect orthogonal grid. Each outputs a pixel in the output file. When there is not enough light information for the photo-diodes on the sensor to make up precise calculations on light intensity and specific color, the electronics try to "force" and answer boosting the incomplete data or interpolating neighboring pixels, thus often introducing "false" information. This is what we name "noise".



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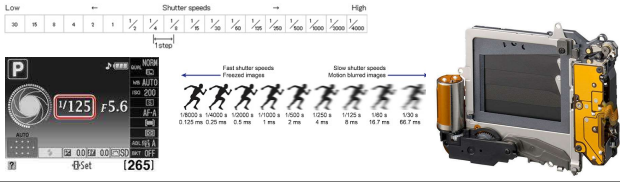
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## What is shutter speed?

Shutter speed is a measurement of the time the shutter is open, shown in seconds or fractions of a second: 1 s, 1/2 s, 1/4 s ... 1/250 s, 1/500 s, etc. The faster the shutter speed, the shorter the time the image sensor is exposed to light, the slower the shutter speed, the longer the time the image sensor is exposed to light.



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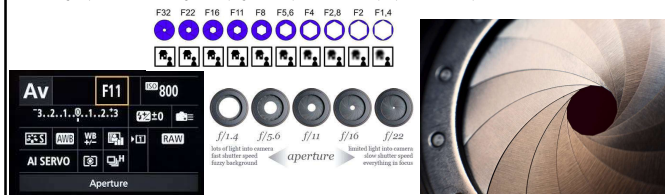
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## What is aperture

Aperture refers to the opening of a lens's diaphragm through which light passes. It is calibrated in f/stops and is generally written as numbers such as 1.4, 2, 2.8, 4, 5.6, 8, 11 and 16. Lower f/stops give more exposure because they represent the larger apertures, while the higher f/stops give less exposure because they represent smaller apertures.



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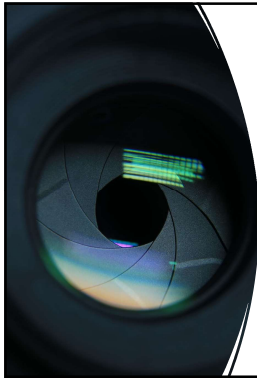
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### How aperture affects depth of field (DOF)

Depth of field is the zone of acceptable sharpness in front of and behind the subject on which the lens is focused. Simply put: how sharp or blurry is the area behind your subject.

- The lower the f/stop-the larger the opening in the lens-the less depth of field-the blurrier the background.
- The higher the f/stop-the smaller the opening in the lens-the greater the depth of field-the sharper the background.

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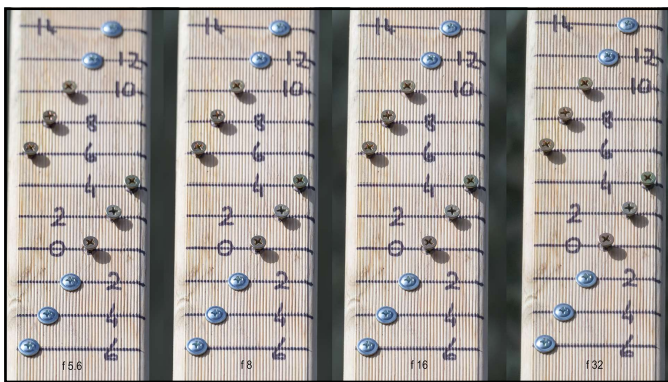
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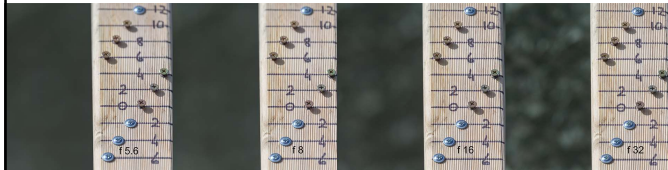
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### How aperture affects depth of field (DOF)



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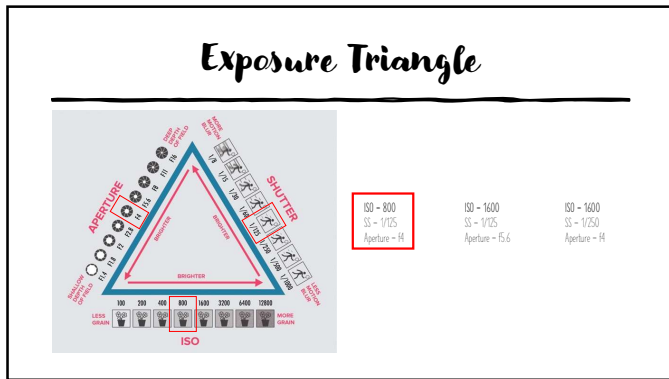
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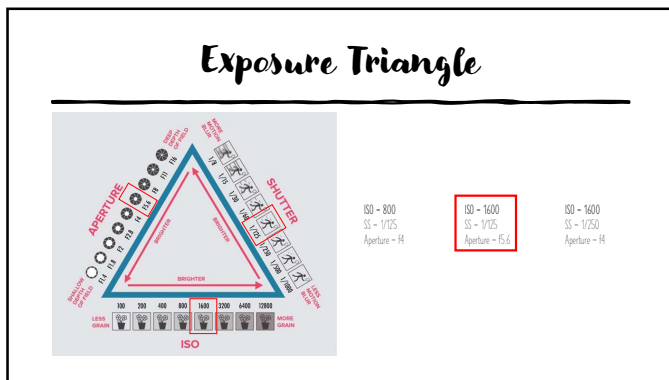
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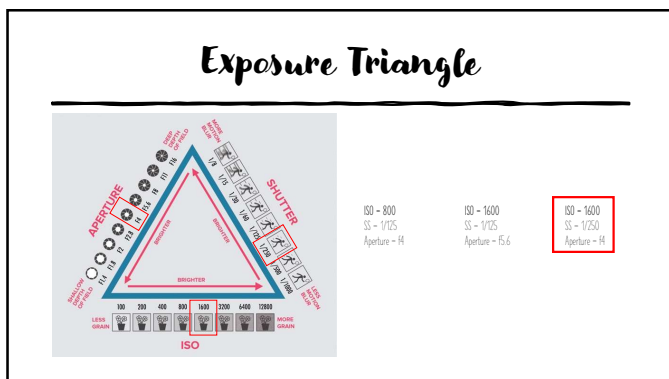
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## Metering modes

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METERING MODE ICON

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## Metering modes

**Matrix (Nikon)** - Matrix metering mode divides the wide area of the frame into multiple segments that instantly analyses your subject's brightness and colour against an on-board database of over 30,000 images. By accurately analysing the information, your camera can appropriately select the best overall exposure values. Matrix metering mode is great for beginners or for when you want your camera to evaluate the entire scene.

**Evaluation (Canon)** - Evaluative metering meters the overall scene in multiple sections in the viewfinder and combines the results to find the correct exposure based on the subject's position and lighting conditions. This is the default metering on most DSLR cameras and can be used for the majority of your photography.

**Multi (Sony)** - Divides into multiple regions and measures each region. The camera determine a well balanced exposure

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## Metering modes

**Centre-weighted (Nikon)** - Centre-weighted metering mode focuses on the centre of your frame when determining the best exposure values, while still considering its surroundings. In some Nikon DSLR, the size of the circle in the centre can be adjusted to suit your needs.

**Centre-weighted (Canon)** - Centre-weighted average metering concentrates the metering on the central part of the viewfinder, but also takes the rest of the frame in to consideration. This mode is favourable when you want to capture a well-balanced exposure, but biased towards whatever is right in the middle of the shot.

**Centre (Sony)** - Measures the centre of the image and determines exposure based on the brightness of the subject there.

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## Metering modes



**Spot (Nikon)** - Spot metering mode causes your camera to only evaluate whatever is at the focal point in your shot and completely ignores the light in the rest of the scene. Focusing on bright or dark areas will give your camera extreme readings, so it is best to focus on a mid-toned subject for setting the best exposure. This is a great mode to use if you are photographing a subject against a bright light source.

**Spot (Canon)** - Spot metering is similar to partial metering, but covers a much smaller area of the scene, usually less than 2% and right in the middle of the frame. This mode is useful for where you want to pick out a small subject.

**Spot (Sony)** - Measures only a part of the subject

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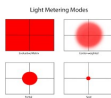
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## When to use

### MATRIX:

1. Evenly lit scenes (either full sun or full shade)
2. When using flash



### CENTER-WEIGHTED:

1. Portraits
2. Macro
3. When the important part of the photograph will stay in the centre of your frame

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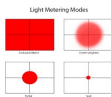
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## When to use

### SPOT:

1. Backlit images
2. Silhouettes
3. High-contrast situations
4. Snowy landscapes
5. When your subject is not filling the largest portion of your frame



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# Histogram

A histogram is a bar graph of a frequency distribution in which the widths of the bars are proportional to the classes into which the variable has been divided and the heights of the bars are proportional to the class frequencies.



Anyone else confused? So what does a histogram really do? And how do you read it?

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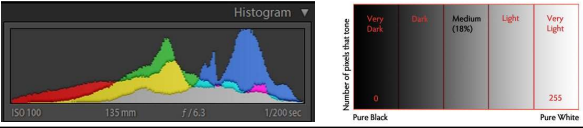
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## How to read the histogram

A histogram is a graphical representation of the pixels in your image. The left side of the graph represents the blacks or shadows, the right side represents the highlights or bright areas, and the middle section represents the midtones (middle or 18%, grey). The heights of the peaks represent the number of pixels of a particular tone (with each peak corresponding to a different tone). Each tone from 0-255 (0 being black and 255 being white) is one pixel wide on the graph, so imagine the histogram as a bar graph all squished together with no spaces between each bar.



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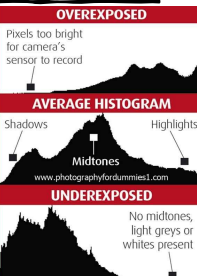
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## What can we learn from the histogram

We can tell that an image is well-exposed if it reaches fully from edge to edge without a gap on one side of the graph, and it isn't heavily going up one side or the other. In an ideal world, the graph should just touch the left and right edges of the histogram, and not spill up the sides. The graph should also have a nice arch in the centre.

However, this "ideal histogram" doesn't always apply in every situation for every scene.



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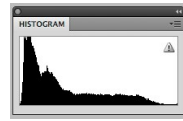
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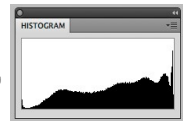
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### What can we learn from the histogram

This is a histogram for a dark subject. It is not wrong, it is just more shifted to the left to represent the tones of the subject. This might be a black cat on dark pavement.



This is a histogram for a light subject (e.g., a white cat) with mostly light tones in the scene and few dark areas. See how it is shifted to the right compared to the dark subject? This is what you want, assuming your scene is mostly light-toned. If you change your exposure to keep the graph centered, you will end up with a grey cat, not a white one.



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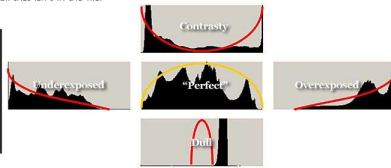
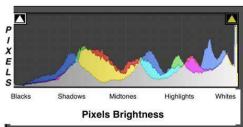
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### What do the spikes up the side mean?

Spikes up the left or right edge of the histogram indicate "clipping" of that tone and a loss of detail in that area. Clipped areas are often unrecoverable, especially in the highlights. It is generally advised to expose so that your graph just touches the right edge (which indicates that you have kept your highlight details). It is usually easier to recover some shadow detail and retain a decent image than to try and create highlight detail that isn't in the file.



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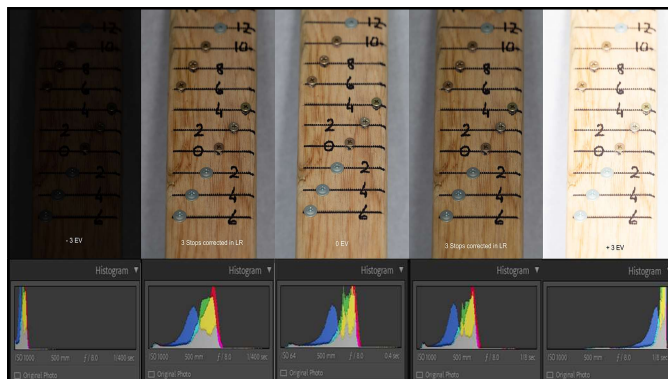
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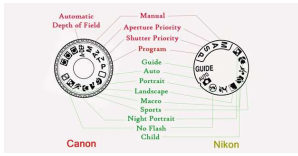
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## Making sense of shooting modes



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## Making sense of shooting modes

**Auto Mode** - Automatic Exposure is when the camera chooses the optimum shutter speed, aperture, ISO and flash settings for your shot. All you need to do is point and shoot. This can be good if you have no idea of what settings to choose and when you need to shoot quickly.



**Program Mode** - When this mode is selected, the camera automatically sets the shutter speed and aperture to achieve what it believes is the best possible exposure for the metering information of whatever scene the photographer has framed. This is *almost* like using a simple point-and-shoot camera in that almost every setting on the camera is controlled by the camera itself. "Almost" because this mode will not automatically deploy your built-in flash, nor will it change your ISO or color space or other more specific settings.



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## Making sense of shooting modes

**Aperture Priority Mode (A / Av)** - The Aperture Priority mode allows the photographer to set a specific aperture while allowing the camera to calculate the proper exposure and assign an appropriate shutter speed. This allows the photographer to change aperture, and therefore change the depth of field of the image, while the camera does the necessary calculations to automatically set your shutter speed.



**Shutter Priority Mode (S / Tv)** - This is the opposite of the Aperture Priority mode. When you select this mode, you control the shutter speed, and the camera controls the aperture. Again, the end result is that the camera is looking for a balanced exposure by assigning an aperture to your chosen shutter speed.



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### Making sense of shooting modes

Manual Mode (M) - The camera's manual mode takes you back to the early days of photography, before computer intervention, when the photographer selected a combination of shutter speed, aperture and ISO to get the desired exposure. This is likely the most intimidating mode of the group.



Manual Mode (M) with Auto ISO - The photographer selected a combination of shutter speed and aperture. ISO is set to Auto to get the desired exposure.



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### Making sense of shooting modes

Sports Mode - Sports mode cranks up your shutter speed in an attempt to freeze action. Usually, it will disable the flash as well.

Portrait Mode - This is like selecting Aperture Priority and opening your aperture to get shallower depth of field. However, depending on the camera, it may also enhance skin tones and soften skin texture automatically.

Night Portrait Mode - This mode should fire off the flash while keeping a slower shutter speed that allows background lighting to remain in the scene.

Landscape Mode - This mode generally maximizes your depth of field, and it may even make the scene's color more vibrant.

Macro Mode - For close-up photography, the camera will either open the aperture to give the image very shallow depth of field or narrow the aperture for the opposite effect. Check your manual to see exactly what your camera does when you select this mode.



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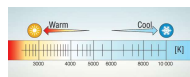
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### What is White Balance?

In non-technical terms, white balance is how warm or cool the overall colors in your photograph look. Your camera is pretty good at reproducing color because it can analyze the scene and compensate for overly warm or cool colors. Usually, colors in your photos will look close to the way they looked in real life. However, your camera is easily confused and can sometimes make the colors too warm or too cool. The most obvious place to spot this problem is the parts of your scene that are, or should be, white. When you take a photo by candlelight, sometimes the whites will look kind of yellow or orange. On a cloudy day, or when you're in heavy shade, the whites might look a little blue. This is called a "color cast," and it happens because the color of the light source varies. Sunlight in the morning and evening can make colors a little redder or "warmer".



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**Practical**

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