

Lens Guide

DSLR filmmakers have a large variety of lenses to choose from, but how do you know which lens works best for each shot in your project? This guide will explain different lenses and what each of them can be used for.

Note: If you have yet to do so, it would help to read the DSLR guide before reading this.

Key Terms:

- Aperture (F-stop, iris): Refers to the amount of light that the lens lets into the camera. There is a ring inside of each lens that opens and closes depending on the selected aperture. Lower F-stop numbers refer to a wider aperture.
- Depth of field (DOF): The amount of the image that appears to be in focus.
- Shallow depth of field (lower F-stop #): A small portion of the image is in focus and draws the viewer's eyes. Shots with shallow depth of field are often considered to be cinematic by audiences. Having a shallow DOF lets more light into the image and so is best suited for low light conditions. However, it is not optimal for moving subjects since you would be forced to rack focus.
- Deep depth of field (larger F-stop #): A large portion of the image is in focus and does not draw the viewer's eyes to any one particular area. Often associated with landscapes. Having a deep DOF lets less light into your image and so is best suited for sunny outdoor shots. It is perfect for moving subjects because they will stay in focus to some degree.
- Focal Distance: A measurement that distinguishes lenses. Refers to the distance in millimeters that you must be from a subject to be able to focus at its closest possible point. Long focal distances mean that you will have to stand far away from your subject and that the field of view will appear to be close to the subject. When you have a long focal distance, it is always best to use a tripod as handheld shots will result in a noticeable camera shake.
- IS: Image Stabilization. A feature that minimizes camera shake when you are shooting handheld. It is recommended to always use IS, if the lens has it (a switch located on the side of the lens), when shooting handheld or on a shoulder mount. It is especially helpful for low light shooting so that you can dial in a slower shutter speed (more light) without having the footage appear shaky. However, you will want to turn it off when the camera is mounted on a tripod so that it does not try to compensate for shaky movements.
- Chromatic Aberration (CA, also called vignetting): Refers to an error in which the corners of an image become distorted. This varies from lens to lens, but it involves the selected aperture. It is most likely to happen at the widest and narrowest aperture settings on the lens (lowest and highest F-stop #). Lenses are sharpest across the entire image in the middle of the aperture range (F8, F11). Although you may never notice chromatic aberration, it will happen if you select F22 or F1.4.

Zoom Lens

- Zoom lenses are the most common type of lens out there. If you ever buy a camera and lens together in a kit, it will be a zoom lens. They give you the ability to change focal distances by zooming in and out on subjects. The larger the range between the two focal distance numbers, the more flexibility you'll have.
- The only con to zoom lenses is that typically they do not allow very low F-stop numbers, thus creating a problem in low light settings.
- Within the canon line, there are two main types of zoom lenses: STM and L series.
 - STM, often referred to as kit lens, is the type of lens that is bundled into kits with the rebel series and the 60D/70D series. STM lenses are much cheaper than L series but do not deliver the same results. If you have the option to use a different lens line, try to avoid STM lenses.



- L series, sometimes referred to as red ring, is the type of lens that is bundled into kits with full frame canon cameras: the 5D and 6D. There are also numerous L lenses that are sold separately from the kits. They deliver stunning results, often being praised for exceptional sharpness and contrast. While they are extremely expensive, we have two at the Media Center that you can rent out for your project (17-40mm, 24-105mm).



- Zoom lens best uses: Documentary filmmaking, narrative filmmaking, event photography, nature photography.
- Drawbacks:
 - Not suited for extreme low light photography and shallow DOF.
 - Expensive in most cases.

Prime Lens

- Although much less common, there are a variety of prime lenses on the market. A prime lens (or fixed lens) simply refers to a lens that doesn't have zoom capabilities. It has one fixed focal length that cannot be changed.
- If you are used to zooming, prime lenses may throw you off at first. With prime lenses, you have to zoom with your feet, which may help you gain a better perspective of the space you are in. If you are shooting an entire project with prime lenses, you will want to have varying focal lengths that you can switch to for different types of shots.

- If you are wondering why a prime lens would be worth the extra hassle, the answer lies in their shallow DOF and low light capabilities. Whereas most zoom lenses can only obtain somewhere between a 2.8 and 4 F-stop at the widest aperture setting, most primes can go as low as F1.4. To put this into perspective, an F-stop of 1.4 is twice as much light as F2.8. When you can obtain wide apertures like this (low F-stop #), you will be able to capture images in darker settings than on a zoom lens.
- Shallow DOF also gives you what is called Bokeh (shown below). While zoom lenses can obtain bokeh, it will not look this nice.



- Best Uses:
 - Low light settings
 - Shallow DOF
 - Capturing bokeh
- Drawbacks:
 - No zoom capability, must change lens to obtain different focal distance.
 - You're paying money for just one focal length as opposed to a range of lengths.



Manual Lens

- A manual lens refers to a lens that does not communicate with the camera. This means that you will have no autofocus capabilities and you must physically select aperture on the lens as opposed to setting it within the camera's menu. Many people are extremely used to autofocus, especially for photography, and thus do not like manual lenses.
- Manual lenses are usually also primes. That means that they will not zoom or autofocus.
- The reason for choosing a manual lens is the price. Since they do not need to communicate electronically with the camera, they are much cheaper.
- I would argue that they also help filmmakers understand exposure better. Having to focus and select aperture manually allows the user to see the physical processes behind each operation.



Cine Lens

- Cine lens refers to lenses that are made primarily for video. They are usually prime lenses but not always. They are always manual.
- The two differences between cine and regular lenses are:
 - De-clicked aperture - This means that there are no hard clicks when selecting aperture on the lens. Instead, the aperture ring functions similar to the focus ring. This function allows you to smoothly rack aperture in the middle of a shot (most commonly if the lighting changes).
 - Focus gears - Focus gears are placed on the focus ring to allow you to hook up a follow focus rig to the lens. Follow focus is an industry standard rig that allows for easier focus pulling.
- Best uses:
 - Narrative filmmaking
 - Low light situations
 - Situations where the lighting changes



Final Notes:

- Larger focal distances are better suited for close up shots with little to no movement.
- Shorter focal distances are better suited for wider or establishing shots and for capturing movement.
- Shallow DOF is better suited for shots in low light locations, shots with little movement and shots that require the viewer to look at one specific area of the image.
- Deep DOF is better suited for shots in bright locations, shots with movement and shots with important backgrounds.
- Although larger focal distances appear to be more zoomed in to an image, you may want to use a short focal distance and physically get close to the subject to acquire a true close up look.
- Use a tripod if you have a slow shutter speed (less than 1/50) or if your focal distance is above 50mm, both of which would cause an unacceptable amount of camera shake if used handheld.
- The longer the focal distance, the shallower the DOF will be. For example, a lens zoomed in to 105mm will have less area in focus than the same lens zoomed out to 24mm even if all settings are the same.