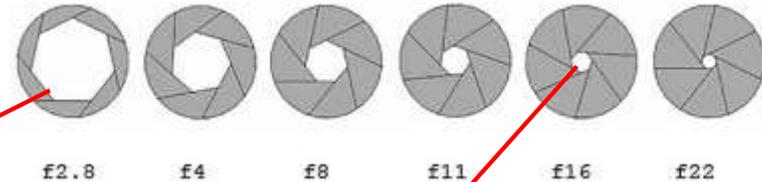


Understanding Your DSLR

Welcome to Module 7

Understanding Apertures and Depth of Field

This is the one subject that tends to confuse photographers when learning how to use the camera. When we speak about depth of field, in simple terms we mean is the area in front of and behind what we are focusing on sharp or blurred? We can control our depth of field by our choice of apertures. The image below was taken with an aperture of f2.8 focusing on Hannah whilst the image on the right was taken at f16 also focusing on Hannah. You will notice that at f16 the background is sharp and at f2.8 the background is blurred.



Understanding Your DSLR

In this module we will set our mode dial to A or Av, Aperture Priority Mode. In this mode we select our aperture and the camera automatically selects our shutter speed. Try this little exercise below with your standard 18 – 55mm lens:

- Start by zooming the lens back to a focal length of 18mm (wide angle view)
- Now by turning the command dial/adjustment wheel that you adjusted your shutter speed with earlier in the course, and the camera mode dial set to A or Av you will see that you are now adjusting your aperture and the camera is automatically selecting your shutter speed. See what range of apertures you have available? Make a note of these, you should be getting something like f3.5 to f22.
- Now zoom your lens in to 55mm and repeat the previous exercise. You will now have a range of something like f5.6 to f29 or f36 depending on your lens.
- Have a look at the numbers printed on your lens, you will see **1:3.5 – 5.6** somewhere on your lens, usually around the glass area as you look into the lens. This means that as you have just seen, when your lens is at 18mm the aperture opens to f3.5 and when the lens is fully zoomed in to 55mm it will only open to f5.6.

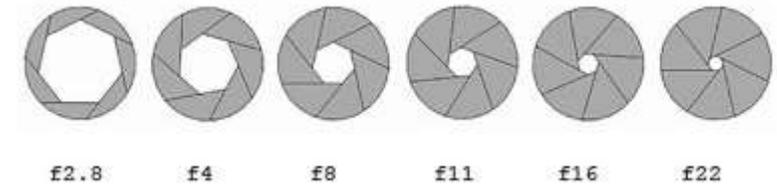
Consumer lenses are manufactured to a budget and therefore as you zoom the lens in to 55mm your range of apertures change from those at 18mm. An expensive professional lens will normally open to an aperture of f2.8 and remain at that size throughout its zoom range. These lenses start at about £1200!



Understanding Your DSLR

The letter 'f' in front of our aperture number stands for factor, it is a mathematical equation that is used to work out the area of the hole in the aperture.

Don't panic about these numbers, as promised when you signed up for this course we will be keeping things simple and easy to understand!



There are a couple of ways to remember the effect of different size apertures on our images, read the following and choose a method that you find easy to remember!

BIG HOLE = SMALL NUMBER = SMALL DEPTH OF FIELD (BLURRED BACKGROUND)

SMALL HOLE = BIG NUMBER = BIG DEPTH OF FIELD (SHARP BACKGROUND)

OR

SMALL NUMBER = SMALL DEPTH OF FIELD

BIG NUMBER = BIG DEPTH OF FIELD



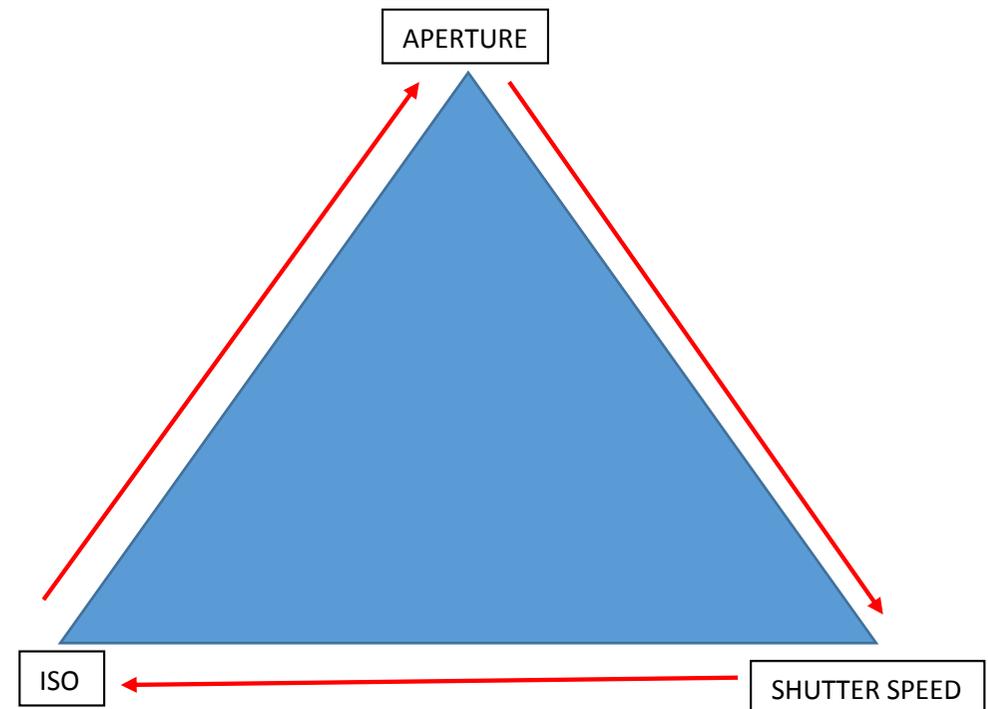
Understanding Your DSLR

Working in Aperture Priority Mode

Now that you have your mode dial set to aperture priority, A or Av, you select your aperture and the camera will automatically select the appropriate shutter speed. Remember there is only one correct amount of light to get a correctly exposed image. In this mode if we select f16, which is a small hole, the likelihood is that the camera is going to select a longer shutter speed. The light entering the lens through a small hole in the aperture is going to take longer to fill up the camera sensor with light. If you select an aperture of f5.6 this is a larger hole and the camera will select a faster shutter speed as there is more light entering the camera through a bigger hole and therefore the sensor will fill up with light quickly. You must be aware of the shutter speed that the camera selects in this mode! **There is no warning when the camera selects a shutter speed below 1/60th second!** If for instance you have selected an aperture of f8 and at ISO 100 the camera selects a shutter speed of 1/15th second you have two options. Firstly you could place the camera on a tripod to avoid camera shake or secondly you could increase your ISO. In these circumstances by changing your ISO to 200 you are effectively allowing twice as much light into the camera and your shutter speed will automatically change to 1/30th second. If you change your ISO to 400 then you are letting in four times as much light and your shutter speed will automatically change to 1/60th second. You can now take the shot while hand holding the camera and avoid camera shake.

WORKING IN APERTURE PRIORITY MODE

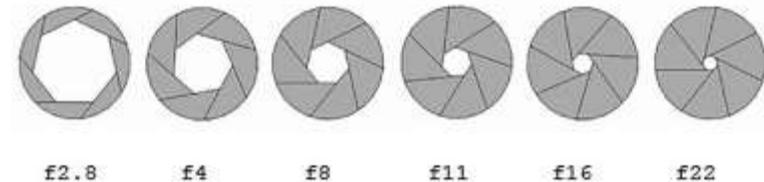
In aperture priority mode we select our aperture and the camera automatically selects our shutter speed. If the shutter speed is not fast enough we turn up our ISO until we get a usable shutter speed or use a tripod.



Understanding Your DSLR

There are three elements that effect our depth of field:

1. The size of the aperture
2. The distance we are from our subject
3. The focal length of the lens



How changing the size of our aperture affects depth of field

The next seven images that appear over the following pages are taken at every different aperture setting. The camera was manually focused on the pawn in the front right of the shot for every image in the sequence and the lens was approximately 60cm away from the pawn. As you will see in the first image the background and foreground are blurred, the first image was taken with an aperture of f2.8. In the final image of the sequence you will notice that the pawn on which we have focused on is still sharp but now the foreground and background are also sharp.



Understanding Your DSLR



f2.8

Understanding Your DSLR



f4

Understanding Your DSLR



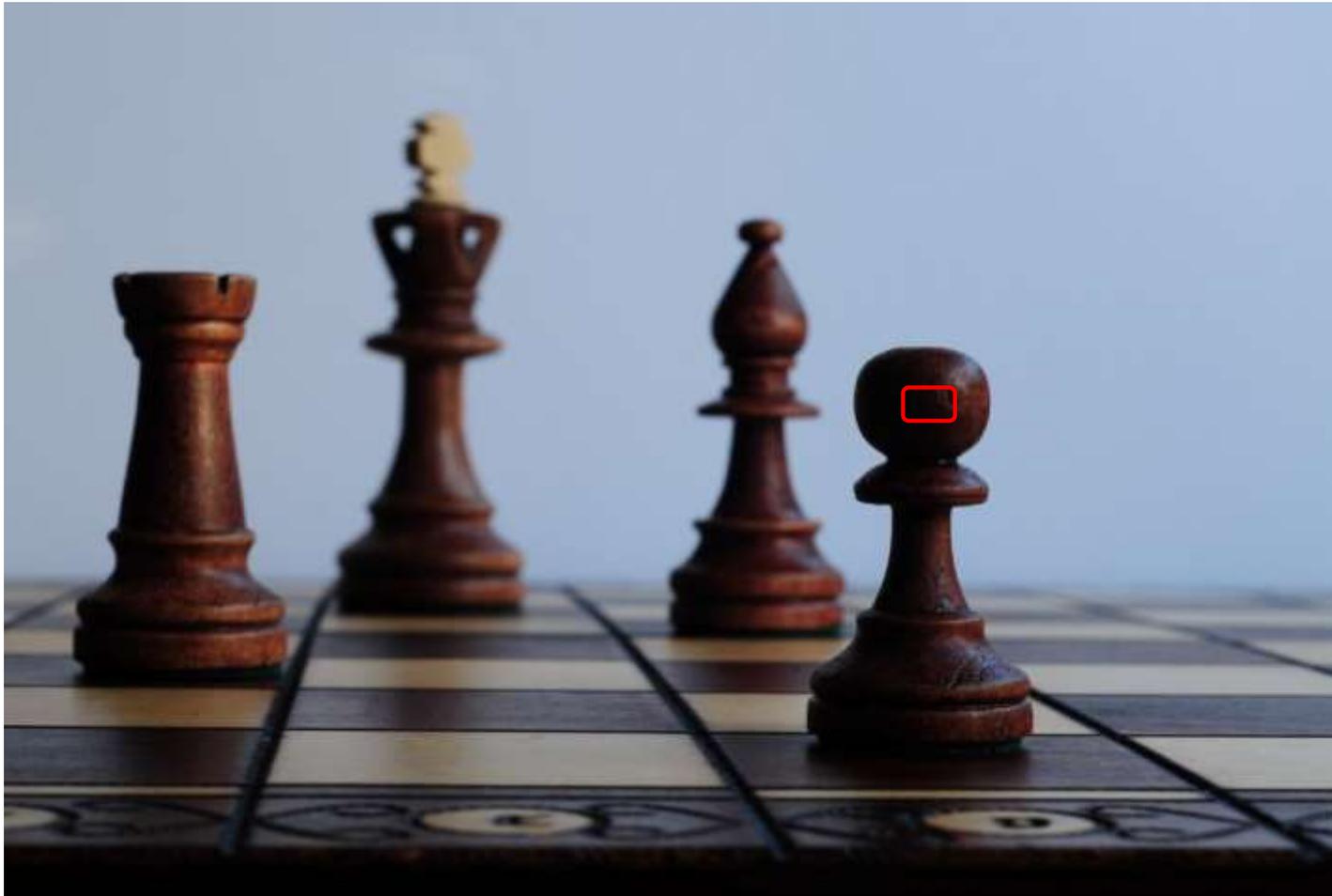
f5.6

Understanding Your DSLR



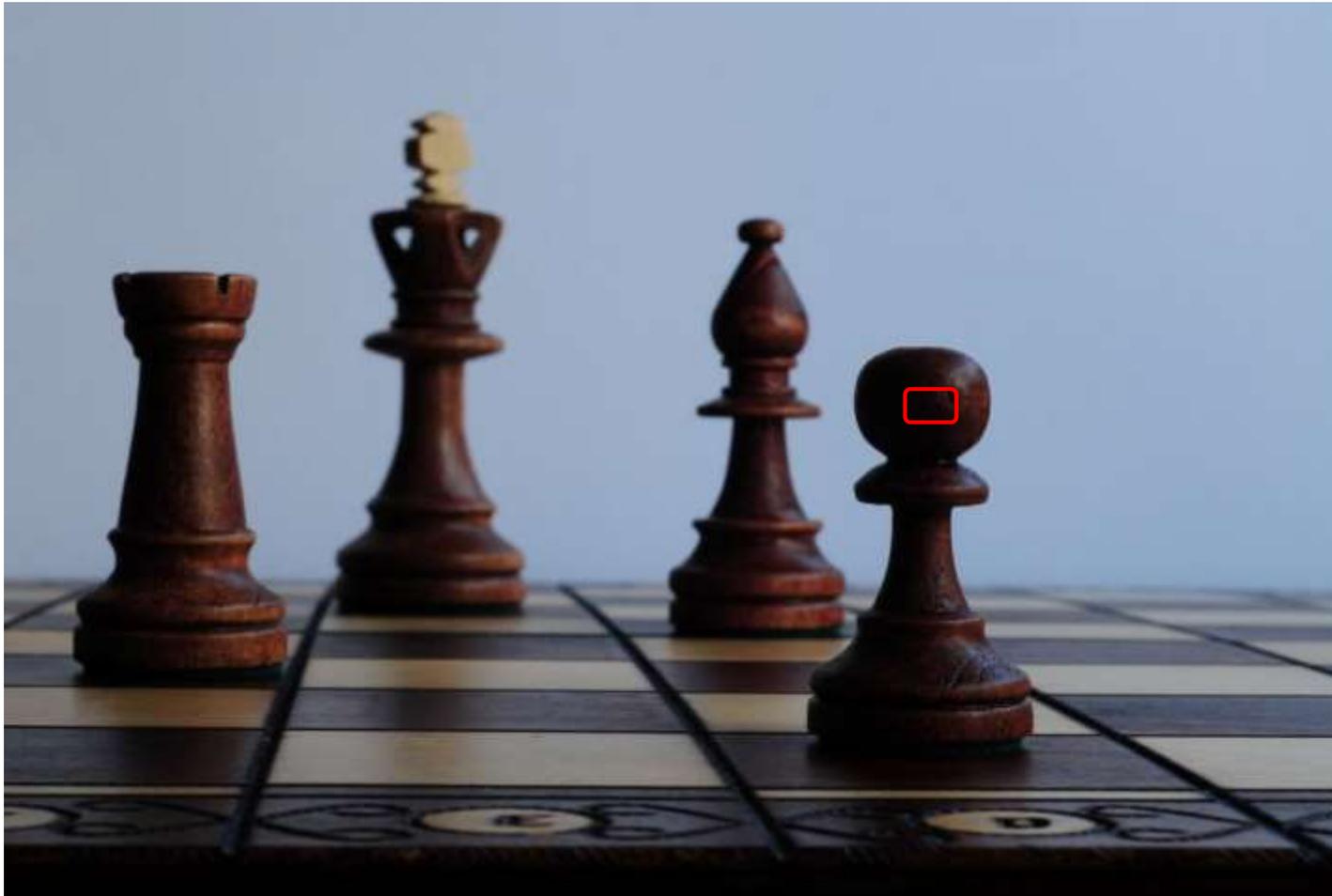
f8

Understanding Your DSLR



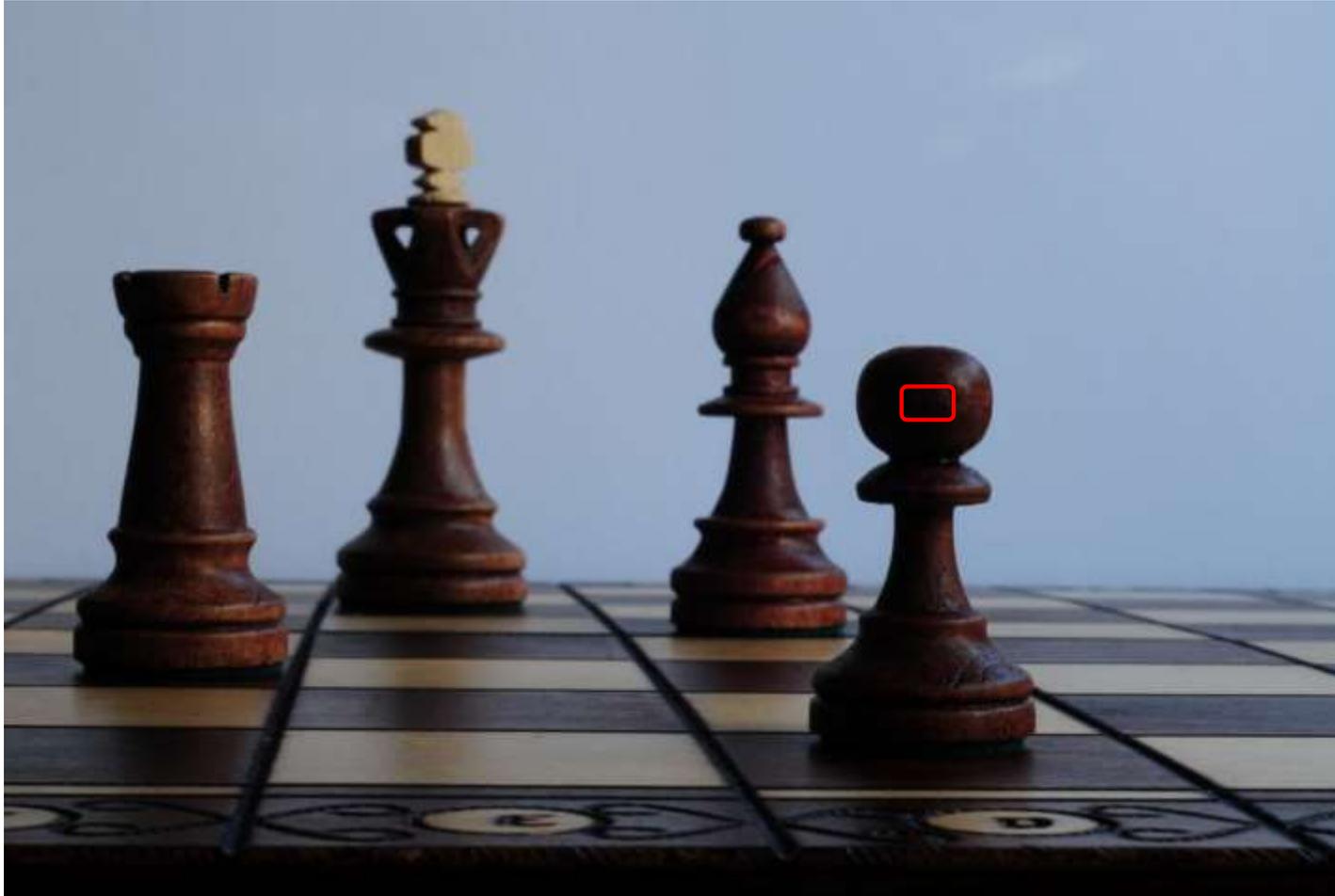
f11

Understanding Your DSLR



f16

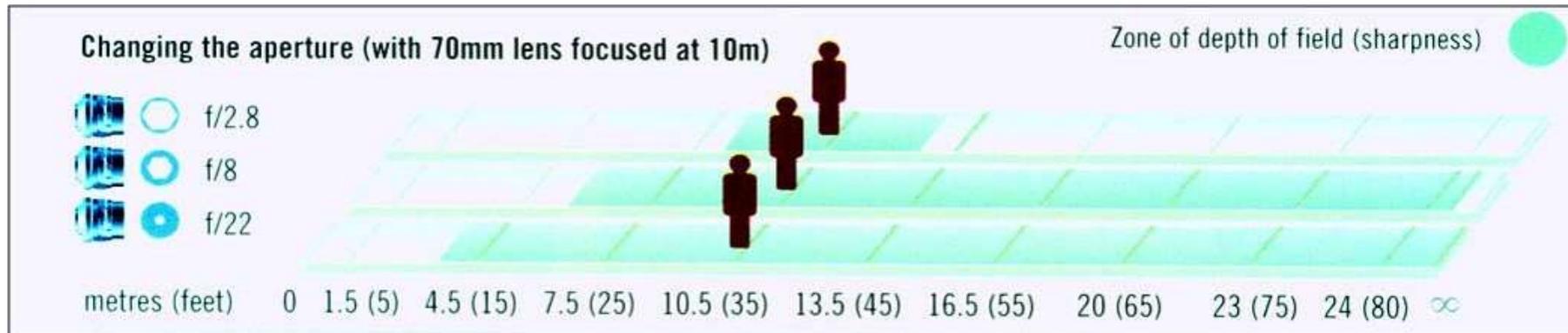
Understanding Your DSLR



f22

Understanding Your DSLR

The chart below explains how depth of field is affected by changing the aperture and remaining at the same distance from our subject whilst using the same focal length for each shot in the sequence. The green area is what is sharp and the remaining white area is blurred.

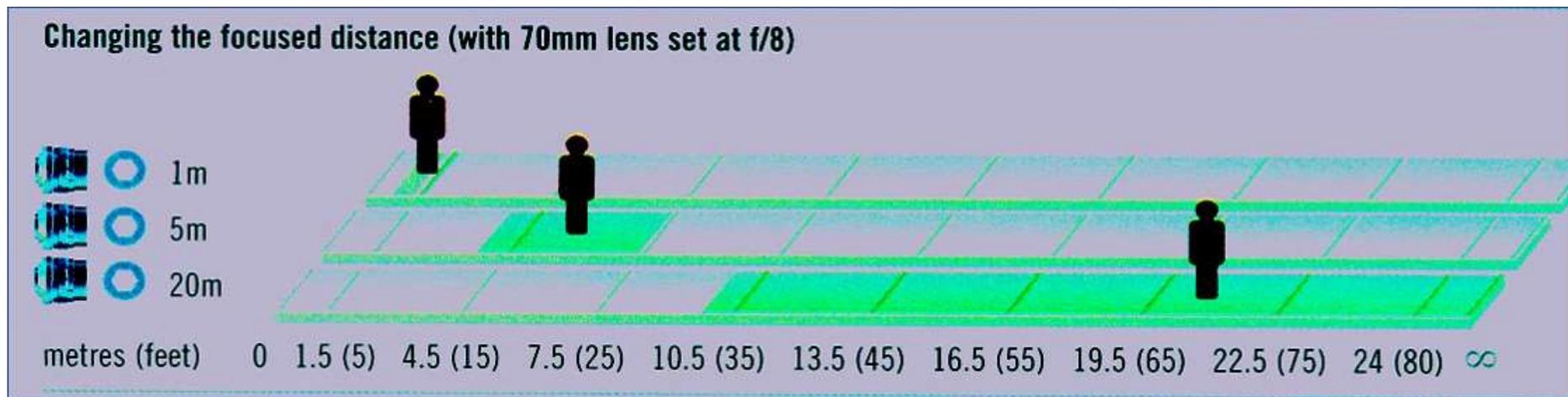


You can try this at home in the garden by lining up seven items and focusing on the second or third object in the line. Take the same shot at every different aperture at the same focal length while focusing on the same object for each shot. You will see how the foreground and background are sharper when you use f16 or f22. Old flowerpots or tennis balls are ideal for this exercise.

Understanding Your DSLR

How moving closer or further away from our subject affects depth of field

The chart below explains how by moving in closer to our subject the depth of field reduces. In this scenario the focal length of the lens and the aperture remain at the same settings for each shot, 70mm and f8. The only thing that changes is our distance from our subject. The green area is our depth of field.

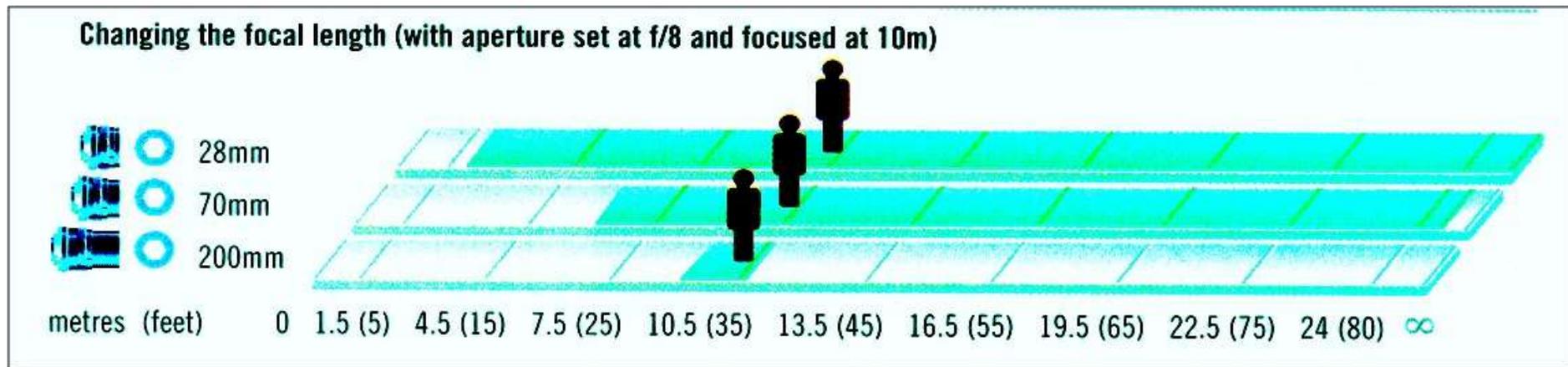


It is important to be aware that when using a shorter focal length lens, an 18 – 55mm for example, you will need to be close to your subject to blur the background. Every lens has a minimum focusing distance which is usually printed somewhere on the body of the lens. Most 18- 55 mm lenses have a minimum focusing distance of about 1ft or 30cm. This is as close as you can get to your subject to focus, if you move closer than this distance then the lens will be unable to focus and will only be able to focus on objects that are further away. Longer focal length lenses have a larger minimum focusing distance usually about 4 to 5 feet for a 70-300mm zoom lens.

Understanding Your DSLR

How zooming the lens in on our subject affects depth of field

The chart below shows how by zooming our lens in closer to our subject our depth of field reduces. In this scenario the camera and subject remain at the same distance apart for each shot, the aperture also remains the same at f8. The only thing that is changing here is the focal length of the lens. Again the green area is our depth of field.



Hopefully you will now understand that as well as our aperture selection the distance we are from our subject and the focal length of the lens both play an important role in deciding if we have a shallow or large depth of field.

Understanding Your DSLR

EXAMPLE

In simple terms if we want to take a shot of a flower with a blurred background using an 18-55mm lens then we must have the lens fully zoomed in to 55mm and use an aperture of f5.6 or lower, if available. You will see the effect in the viewfinder as the aperture is always set to its largest hole, small number when we are composing an image. If the background is not blurred in the viewfinder then you need to move closer to the flower. The aperture doesn't close down to the size we have set until we push the shutter release button to take the image. If we want to capture a landscape type image with the same flower in the foreground and have a large depth of field so both the flower and the background are sharp we need to select an aperture of f16 or f22, move further away from the flower and zoom the lens out to 18mm. The background may still appear to be blurred slightly in the viewfinder but once you take the shot you will see that the background is also sharp. Some cameras are equipped with a depth of field preview button which when depressed will allow you to see if the background is sharp before taking the image.



Canon Depth of Field Preview Button



Nikon Depth of Field Preview Button

Understanding Your DSLR

Why is South Africa Hot – Aperture Priority Mode

Whichever shooting mode we have selected, aperture or shutter priority, we still have to consider each of the following:

- White Balance
- ISO
- Shutter Speed
- Aperture
- Histogram

In aperture priority mode once we have set the white balance to whatever the lighting conditions are we set our ISO to 100 to start with. We would then select an appropriate aperture for the image we want to capture. Once we have chosen our aperture we need to see which shutter speed the camera has selected. If the shutter speed is not fast enough we need to begin to increase our ISO in increments until we obtain an appropriate shutter speed. Once we have taken the shot we then examine our histogram and adjust if necessary using exposure compensation.

You are possibly asking yourself now which mode should I use for which set of circumstances. We would suggest that in these early stages of learning how to use your camera you select shutter priority mode if freezing or showing movement is important and use aperture priority mode if depth of field is important.

You will begin to understand as you progress what type of result you will get prior to taking the shot by simply looking at the shutter speed and aperture numbers in the viewfinder.

Understanding Your DSLR

Summary Apertures and Depth of Field

Remember there are three elements to consider when deciding about depth of field in our images

- The size of the aperture
- The distance you are from what you are focusing on
- The focal length of your lens

This translates to:

If we want to take a portrait shot and blur the background we select an aperture that will give us a shallow depth of field, something like f2.8, f4 or f5.6 depending on the maximum aperture of the lens that you are using. When we look through the viewfinder we will be able to see the shallow depth of field effect prior to taking the shot. If we can't see this effect we need to zoom the lens in or get closer to our subject.

If we want take a landscape image with everything sharp from the foreground to the background we need to select an aperture of f16 or f22 to give maximum depth of field. When we look through the viewfinder to compose the shot the background may appear to be blurred! This is because we are looking through the lens with the aperture at its biggest hole. The aperture will not close down to f16 or f22 until we push the shutter release button. If your camera has a depth of field preview button then you will be able to check the depth of field prior to taking the shot. If an object in the foreground or background is still blurred you will need to move further away and take the shot again or zoom your lens out to a wider angle of view.

Remember

In A or Av mode the camera will automatically select our shutter speed and there is no warning when it drops below 1/60th second! You need to pay attention to which shutter speed the camera selects and turn up the ISO if it's not fast enough. If there is anything moving in the shot you will need to adjust the ISO until your shutter speed is faster than 1/60th second. If you are taking a landscape type image with nothing moving then as long as you use a tripod there is no reason to increase the ISO to achieve a faster shutter speed, simply leave it at its lowest setting to avoid any noise/graininess in the shot.

