

Depth of Field for Beginners: The Essential Guide



You may have heard the term *depth of field* (DoF), but what actually *is* depth of field, and how can you control it for artistic results?

In this article, you're going to discover all of the depth of field fundamentals, including:

- A simple definition of depth of field
- Why depth of field really matters in photography (and why it's a concept you *must* understand)
- The factors affecting depth of field in your photos
- How to adjust the depth of field for insanely artistic results
- Much, much more!

What is depth of field in photography?

Depth of field is the zone within a photo that appears sharp and in focus. In every picture, there is a point of focus (where you actually *focus your lens*). But there is also an area both *in front of*, and *behind*, your point of focus that *also* appears sharp – and that area corresponds to the depth of field.

The sharp zone will vary from photo to photo depending on different factors, such as [aperture](#) and distance to the subject (discussed in more detail below).

So by adjusting your [camera settings](#) and your composition, you can determine the amount of your image that turns out sharp and the amount of your image that ends up blurry.

Deep vs narrow depth of field: a few DoF examples

Images that are sharp from front to back are said to have a *deep depth of field*. A deep depth of field is popular in landscape photography, where you often want to show every little detail from the scene.

Here's an example of a deep depth of field photo; notice how the sidewalk is sharp, the trees are sharp, and even the distant background appears sharp:



And here's another deep depth of field example, with complete sharpness from foreground to background:



On the other hand, some images have very *small* zones of focus, known as *shallow depth of field*. Shallow depth of field photos are immediately noticeable because the subject will remain tack-sharp, while the background renders as a smooth, creamy blur:



This effect is especially popular in portraiture; photographers use it to draw attention to their subject while preventing background distractions. But you'll also see shallow depth of field macro photography, as in this photo here:



And you can also find shallow DoF street photography, photojournalistic photography, and even landscape photography.

(Looking for more depth of field examples? [Here's](#) a collection of images with a very shallow depth of field, and [here's](#) a collection with a much deeper depth of field.)

Why is depth of field important?

The amount of a photo that's sharp is a *key artistic component of photography*.

Whether your image has a shallow depth of field or a deep depth of field can make a huge difference (and can often make or break the composition).

For instance, if you're photographing a portrait subject with a distracting background, failure to create a shallow depth of field will often result in a very snapshot-esque, mediocre photo.

And if you're photographing a landscape with a beautiful foreground, a stunning midground, and a jaw-dropping background, failure to use a deep depth of field will prevent the viewer from appreciating the entire scene.



Getting the right depth of field for your shot can make all the difference. Look at how a shallow depth of field (right) creates a much more pleasing, non-distracting background compared to a deep depth of field (left).

Bottom line:

Depth of field matters. Learn to control it, and your photos will immediately improve.

Factors affecting depth of field

There are three main factors that determine depth of field. They are:

1. Aperture (f-stop)
2. Distance between your lens and your subject
3. Focal length of the lens

By understanding these variables and how they work, you can produce a deep or shallow depth of field at will.

Aperture (f-stop)

Aperture refers to a hole in your lens through which light enters the camera.

And the larger the hole, the shallower the depth of field.

You may be familiar with f-stop values, which look like this: f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, etc. The smallest f-numbers correspond to the widest apertures and therefore the shallowest depth of fields. And the larger f-numbers correspond to the narrowest apertures and therefore the deepest depth of fields.

In other words:

Large aperture = Small f-number = Shallow (small) depth of field

Small aperture = Large f-number = Deep (large) depth of field

Now, adjusting the aperture (f-stop) of your lens is the simplest way to control your depth of field while setting up your shot.



The image on the left was captured at f/5, which resulted in a relatively shallow depth of field (note the blurred leaves). The image on the right was captured at f/32, which created a deep depth of field and a sharper background.

So if you're photographing a landscape and you want a deep depth of field, just set your aperture to $f/11$ or so, and you'll generally get foreground-to-background sharpness. If you're photographing a portrait and you want a shallow depth of field, set your aperture to $f/2.8$ and you'll produce a beautiful, blurred background.

Distance between your lens and your subject

The closer your subject is to the camera, the shallower your depth of field becomes.

(Note that I'm using the terms "subject" and "point of focus" interchangeably here – if you accidentally focus behind your subject, then the depth of field will be completely different.)

So if you get up-close and personal when photographing a flower, the depth of field will shrink. And if you take ten steps backward, the depth of field will increase.



When you get very close to a subject, the depth of field shrinks – regardless of your aperture!

Focal length

The longer your focal length, the shallower the depth of field.

So if your subject is 33 feet (10 meters) away and your aperture is set to $f/4$, a focal length of 50mm will give you a depth of field range from around 22-63 feet (6.7-19.2 meters) for a total DoF of 41 feet (12.5 meters).

But if you zoom into 100mm while standing in the same spot, still using an aperture of $f/4$, the depth of field changes to about 29.5-37.5 feet (9-11.4 meters) for a total DoF of 8 feet (2.4 meters).

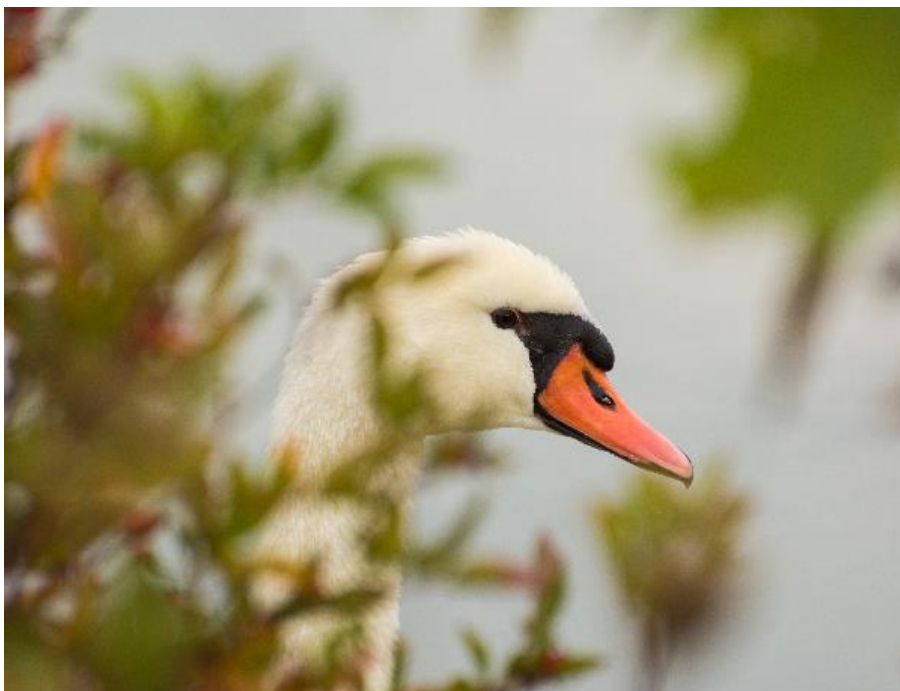
Putting it all together

Aperture, distance to your subject, and focal length *together* determine your depth of field.

Which means that these three factors can combine to produce a very extreme depth of field effect, or they can cancel each other out.

For instance, if you shoot at $f/2.8$, *and* you get close to your subject, *and* you use a telephoto lens, you'll achieve an ultra-shallow depth of field.

But if you get close to your subject while using a wide-angle lens, the two factors will generally cancel out, resulting in a medium depth of field.



This image of a swan hiding in the tall foliage was captured from about 16 feet (5 meters) at 300mm. This combination of focal length and distance created a depth of field of approximately 2 inches (5 centimeters), which is why the foreground and background appear so blurry.

How to work with depth of field: a step-by-step approach

While knowing the theory is great, you must also understand how to apply depth of field when out shooting.

Here's my quick step-by-step approach to achieving perfect depth of field:

Step 1: Set your camera to Aperture Priority or Manual mode

Most cameras only offer two modes where you can easily control the aperture and therefore the depth of field:

[Aperture Priority mode](#) and [Manual mode](#).

So the first order of business is to switch your camera Mode dial over to one of these modes.

(If you're a beginner, Aperture Priority mode is probably the better option – it'll let you input the aperture, while your camera determines the best shutter speed for a good exposure. If you're more advanced, Manual mode will let you select the aperture and shutter speed independently for greater creative control.)

Step 2: Determine whether you want a deep or narrow depth of field

Carefully observe your scene. Ask yourself: Do I want to blur out the background? Or do I want to keep the entire shot sharp?

Generally speaking, if your background is *distracting*, it's best to use a shallow depth of field. But if the background *adds* to the scene – for instance, it contains beautiful clouds, a stunning mountain range, or it contributes valuable context – then use a deep depth of field.

If you're aiming for a shallow depth of field look, you generally don't need to calculate the depth of field precisely. On the other hand, if you want to keep the entire shot sharp, you may want to calculate the hyperfocal distance (see the section on hyperfocal distance below) to determine the best point of focus.

Step 3: Adjust your aperture, distance to subject, and focal length

Now that you know the depth of field effect you want, it's time to make the relevant changes to your composition and/or camera settings.

If your goal is a shallow depth of field effect, set your lens to its widest possible aperture. Then get as close as you can to your subject and take your shot.

If your goal is to achieve a deep depth of field effect, use a wide-angle lens (if possible) and get as far back from your subject as you can without sacrificing the composition. Then dial in a narrow aperture – often f/8 or beyond is ideal, though see the next section on hyperfocal distance if you're not sure what's best – focus a third of the way into the scene, and take your shot.

(Quick tip: When you look through your camera's viewfinder, you're generally seeing a preview of the image at your lens's *widest* aperture. But many cameras offer a [depth of field preview button](#); press this, and you can preview the actual depth of field in real-time before hitting the shutter button. Check your manual to see if it's an option on your camera!)



Step 4: Check to make sure you got the depth of field right

After you've taken an image, especially when you're just starting out, I highly recommend you check your camera's LCD to ensure you've nailed the depth of field.

Take a quick look at the image in playback mode. If your goal is to keep the entire shot sharp, magnify the photo to check the nearest foreground object and the most distant background object, just to be sure everything looks good.

If you notice an error, you can always reshoot before the light changes.

Hyperfocal distance: how to get everything in focus

The [hyperfocal distance](#) is a special point of focus in your scene. It's the point for a given aperture and focal length that allows you to maximize depth of field.

Specifically, when you focus at the hyperfocal distance, your depth of field will extend from *half* your point of focus all the way to infinity.

As you can imagine, this is useful when you want to keep the entire scene sharp; you just dial in your preferred aperture, then set your point of focus at the hyperfocal distance.



An image like this one – with a clear foreground and a distant background – can benefit from focusing at the hyperfocal distance.

But how do you determine the hyperfocal distance when out in the field? You have a few options. First, you can use a hyperfocal distance calculator like the one offered by [PhotoPills](#), which will let you dial in your focal length and your selected aperture before spitting out a hyperfocal distance.

Alternatively, you can focus a third of the way into the scene, which is a good rule of thumb – assuming you've used a relatively narrow aperture (f/8 or beyond is good) and a wide-angle lens.

Doing precise depth of field calculations: charts, calculators, and apps

Most photographers don't need to gauge depth of field exactly while in the field, so doing quick estimates or using easy rules of thumb works fine, especially if you check your LCD afterward.

But you may find yourself in a situation where depth of field matters a great deal – for instance, if you're a landscape photographer dealing with a *very* deep scene, you're a macro photographer shooting at extreme magnifications, or you're a product photographer and you don't have the opportunity to reshoot if you mess up the depth of field.

In such cases, I'd recommend turning to some type of depth of field "helper." You have a few options:

1. Depth of field charts. These show you depth of field ranges across different apertures and lens-to-subject distances. You can print them off and laminate them if you want a physical copy, but you'll need a different chart for each lens focal length, which can get frustrating if you're using multiple primes or even a single zoom.
2. Depth of field calculators. These let you input your focal length, your distance to the subject, and your aperture, then they'll spit back out your depth of field range. They're very flexible, but you'll need to keep one handy on your phone. They're also less helpful than charts (because a chart lets you see how your depth of field changes as you make small adjustments to aperture and subject distance).
3. Depth of field apps. There are many free and paid depth of field apps, most of which offer a combination of the above two DoF helpers. For instance, PhotoPills offers *both* a calculator *and* a chart (plus, the chart is adjustable – you can dial in your focal length and it'll immediately recalculate your depth of field ranges). And PhotoPills includes other helpful photography aids, such as sunrise/sunset times and directions, hyperfocal distance charts and calculators, and more. Of course, you need to carry your phone with you at all times, but this is still the preferred solution of most landscape photographers.

Subject distance (feet)	f/1.0	f/1.1	f/1.2	f/1.3	f/1.4	f/1.6	f/1.7
	12.00	12.00	12.07	12.07	12.00	12.09	12.1
13	12.93 13.07	12.93 13.07	12.92 13.08	12.92 13.08	12.91 13.09	12.9 13.11	12.89 13.11
14	13.92 14.08	13.91 14.09	13.91 14.09	13.9 14.1	13.89 14.11	13.88 14.12	13.87 14.13

The depth of field chart offered by PhotoPills.

Ultimately, the DoF aid you choose depends on your preferences – so feel free to try each option out and see which one you like best!

When to use a shallow depth of field

A shallow depth of field will make your subject stand out from the background. Here are a few situations when a shallow depth of field often makes sense:

- In portrait photography, when you want to emphasize your subject's features
- In wildlife photography, when you want the animal to stand out
- In sports photography, when you want to bring attention to the athlete
- In macro photography, when you want to focus the viewer on a flower, plant, or insect
- In event and street photography, when you want to isolate an individual in a chaotic environment

Note that using a wide aperture for a shallow depth of field will also increase the amount of light hitting your sensor, which will in turn let you boost the shutter speed. This is a major benefit if you're shooting in low light or you need ultra-fast shutter speeds to freeze the action.



Here, I used a shallow depth of field effect to make the bird separate from the background.

When to use a deep depth of field

A deep depth of field provides context, highlights small details, makes scenes appear more lifelike, and – when combined with certain composition techniques – increases depth. Here are some situations when a deep depth of field is best:

- In landscape photography, when you want to lead the viewer from foreground to midground to background, or you want to emphasize both interesting foreground features and stunning background features
- In macro photography, when you're working at high magnifications, but you want to keep your entire main subject sharp
- In street photography, when you want to emphasize the busyness and chaos of a city
- In architectural photography, when you want to show off an entire building
- In real estate photography, when you want to highlight an entire interior

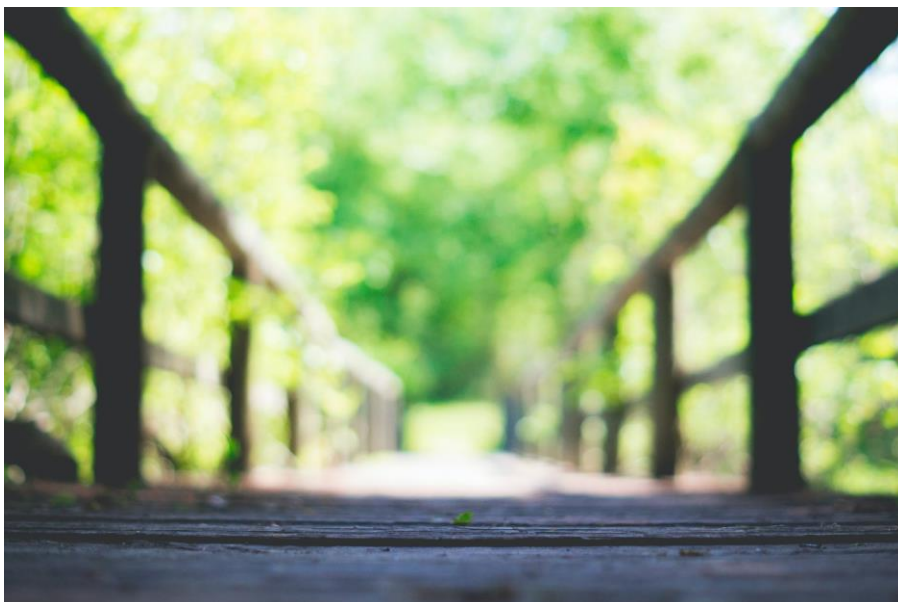


A landscape shot like this one often requires a deep depth of field; thanks to the f/16 aperture, the road, the fallen leaves, and the distant trees all remain sharp, and the viewer feels like they could walk into the scene.

Depth of field: final words

Depth of field is an essential concept for photographers of all stripes.

So grab a camera and practice working with depth of field. Look at photos you admire and consider the depth of field used by the photographers. And most importantly, understand how depth of field can improve your images!



Depth of field FAQs

Is depth of field equally distributed in front of and behind my focus point?

No. Depth of field is usually about one-third in front and two-thirds behind your point of focus, though as your focal length increases, the DoF distribution does become more equal.

How will understanding depth of field improve my images?

Keeping your images sharp is an essential skill, and knowing how to make parts of your images sharp and parts out of focus is a key artistic tool for creating stunning results.

How can I set the depth of field precisely for each photo?

You can use a depth of field chart, calculator, or app to determine your exact depth of field given a particular focal length.

Can depth of field be adjusted to get everything in focus?

Yes. You must use a concept called the *hyperfocal distance*; when you focus at this point, you'll maximize depth of field and generally keep all of your image sharp.

What is bokeh?

Bokeh means "blur" in Japanese. A strong bokeh effect is produced in the out-of-focus areas of your image (i.e., in areas beyond the depth of field). For the best bokeh, you'll need an ultra-shallow depth of field, though you can also maximize bokeh quality in other ways, such as by increasing the distance between the subject and the background.