

# Macro and close-up photography

---

Macro photography is close-up photography.

The classical definition of macro photography is that the image projected on the "film plane" (i.e., film or a digital sensor) is close to the same size as the subject.

## What Kind of Camera

Point and shoot digital cameras can have remarkable macro capabilities, but for best results you want a single-lens reflex camera.

These allow you to attach special-purpose macro lenses and show you, in a bright optical viewfinder, what you will get on the sensor.

For many beginning in macro photography money is often the limiting factor. You can spend a tremendous amount to obtain a state of the art system or [spend less](#) by purchasing extension tubes or close up lenses and using them on your existing equipment. I know of a [photographer who does not use macro lenses](#), but relies only on extension tubes alone.

For anyone who wants to start I suggest getting a good camera that has features such as manual focus, manual override of aperture and shutter settings. Many of the major manufacturers such as Nikon and Canon fit this bill and some lesser ones too.

The next key piece of equipment is a rock solid tripod. Without a good tripod it is difficult to focus and deal with the very shallow depth of field that is available when doing close up photography. The tripod is the one piece of equipment that you do NOT want to skimp on. I suggest getting one that can be made to be very low to the ground, which is critical for photographing wildflowers or small critters like insects. Many of the higher end tripods do not come with a head, so the purchase of a tripod head that allows you flexibility at several positions and is very solid is a sought after feature in selecting a tripod head.

The next piece of equipment is dependent upon how much you want to spend. You can purchase a macro lens and they come in many sizes such as 60mm, 105mm, and 200mm. As the lens gets larger so does the purchase price. A macro lens is often the best equipment for macro photography, but for those who do not have money to burn some extension tubes and close up lenses may be the answer.

Finally, you might want to look at lighting. There are numerous systems for adding lighting to a closeup/macro shot. The usual flash may not work due to proximity to the target. Ring flash or light can be fitted to the lense or you may use remote light and reflected options.

Again, if cost is an issue, then look at the DIY alternatives. Using ultra-bright LEDs can work very well for a minimal cost.

## Close-ups



The first problem we need to look at is how close the lens will focus. Lenses have a minimum focus distance which varies considerably from lens to lens, some longer zoom lenses have a 'macro' setting and will focus quite close but most lenses will not focus close enough to take the picture on the right.

## Close-up Lenses

Close-up lenses are a bit like reading glasses, they are attached to the front of the lens and their strength is measured in diopters. So a +2 diopter lens will focus closer than a +1 etc. Using close-up lenses solves the problem of needing extra light but now you have something on the front of your lens. The front element of your lens and the beautiful multi coating on it, that you paid a fortune for and have lovingly looked after, are not being used. The quality of your photo is now, to some extent at least, in the hands of your close-up lens. So make sure you buy a decent make, they are not expensive so there is no need to buy the cheapest.

## Extension Tubes

If the lens you are using will not focus close enough there are a couple of ways to make it do so. If the lens is detachable from the camera, you can use 'extension tubes'. These usually come in a set of three which can be used separately or together. They fit between the lens and the camera body and, as the name suggests, there is no glass in them, they merely serve to move the lens further away from the film plane (or CCD on a digital camera). The lens will now focus on closer objects than it would before but will no longer focus on infinity.

Extension tubes are a good solution as you are still using the quality lens that you paid so much money for and so the picture quality will be the same as for any other shot. The downside (there's always a downside, you never get anything for nothing) is that you need more light (**the [inverse square law works just as well behind the lens as it does in front](#)**), either a longer shutter time or a wider aperture. Your meter will automatically compensate for this but it can lead to severe depth of field problems which we will discuss in a couple of paragraphs.

The other issue with extensions tubes is cost. If you have cheap 'plain' tubes then you will lose all the 'thru the lense' facilities that you may have had. Auto focus and metering will not work unless the tubes are pass thru, allowing all the connections to pass between the camera body and the lense. These tubes are very expensive in comparison.

## **Depth of Field**

There is little depth of field at macro distances and very little at closeup. Try to orient your subjects so they lie in the plane of focus. For instance, you have to snap butterflies when their wings are lying flat. If you can do this you can get the entire bug sharp, otherwise you get an amateur looking photo.

## **Aperture**

Because there is so little depth of field you need the smallest aperture possible without causing diffraction. I always set my film camera to an effective aperture of f/32. Experiment and see which works best for your setup. Of course you need a lot of light to do this well. For digital you might want to try f/22 or f/16 to reduce diffraction. Try it for yourself and see what works best; it doesn't cost anything to experiment in digital.

These are the effective apertures set on the camera, not marked apertures on an aperture ring. As you focus more closely you lose light up to two stops at life size. Nikon AF cameras calculate this automatically. When I say f/32 on the camera it equates to f/16 on the lens at life size. Just set your modern SLR to f/32 at the camera and don't worry. I have more about this under bellows factors below.

## **Exposure**

I manually set the camera to f/32 for depth of field and set the shutter to the flash sync speed (1/125 to 1/500 depending on your camera) to eliminate ambient light.

I use the TTL flash system to let the flash control itself for perfect exposure as I vary distance.

You also can use manual flash exposure, however as you vary your distance you'll also vary your exposure. You'll quickly find that your distance varies a lot shot-to-shot while hand-held and give up on manual exposure.

## **Focus**

Use manual focus while hand held. Hand motion alone changes camera distance so much and so quickly that it drives any Auto Focus system crazy.

I usually focus my lens and then focus the image by moving the camera. This keeps framing constant. Small variations in your position become huge variations in image size, so fixing the focus and moving the camera keeps this stable.