

# Close-up Photography with 35 mm Cameras



Dewdrops on a fern, the vein structure of a leaf, the detail of a bumblebee's wing—much of close-up photography is concerned with recording details or small subjects. Naturalists use close-up photography to reveal delicate beauty sometimes hidden from the human eye.

Because of many advances in cameras and lenses, close-up photography is now easy even for the beginning photographer.

This information will help you to use a 35 mm single-lens-reflex (SLR) camera to record the wonder and beauty of the miniature world and to discover and explore small objects.

## THE GIVE AND TAKE OF CLOSE-UPS

Close-up photography is a balancing act. The subject matter is so close to the camera lens that you must carry out each step with great care.

To make close-ups, you must consider the following factors and the relationships between them:

- The greater the magnification, the more limited the depth of field. In close-up pictures, depth of field is very shallow.
- Smaller apertures produce greater depth of field.
- Medium to small apertures, such as  $f/8$ ,  $f/11$ , and  $f/16$ , require longer exposure times. You may need to use a tripod to hold the camera steady.

Selecting a high-speed film or adding flash illumination will let you use smaller apertures for greater depth of field and/or higher shutter speeds to minimize subject movement or the effects of an unsteady camera.

## RULES OF THE ROAD

Here are four simple rules that will guide you in learning how to take close-up photographs:

1. Know your camera well enough so that you can focus, set the aperture and shutter speed, make the exposure, and advance the film without thinking too much about the sequence.
2. Use a camera and lens of the best quality. Choose features that appeal to you for both conventional and close-up photography. (See "Cameras" and "Lenses.")
3. Experiment with different camera angles and subject distances to view as many possibilities as you can before making the exposure. Consider what features you most want to show; then get close enough to fill the frame with the subject.
4. Keep a written record of each exposure so that you can learn from your successes and your mistakes. Your notes should include the film type, the aperture and shutter speed, and the close-up equipment and lighting you used.

## FILMS

Kodak makes a variety of films suited for close-up photography.

Basically there are two types of film: negative film and transparency (slide) film. The result with a negative film is a color or black-and-white print. Negative films have greater exposure latitude and can handle contrasty lighting better than slide films.

The result with a slide film is a transparent color photo that matches the original scene. Slide films require more accurate exposure than negative films. You can project slides or have prints made from them.

Films are available in low, medium, high, and very high speeds.

Low-speed films have the finest grain and best resolution. With a low-speed film, you will need to use flash, work in bright sunlight, or mount your camera on a tripod. If you prefer slides, KODACHROME 25 Film has extremely fine grain and excellent color rendition.

Medium-speed films offer a good compromise between speed and image quality. KODACHROME 64 Film has remarkable sharpness and excellent color rendition. KODAK GOLD 100 and 200 Films offer high sharpness and more color saturation under general lighting conditions. KODAK ROYAL GOLD 100 Film is a medium-speed film with microfine grain. For slides with rich, saturated color and excellent sharpness, you can use medium-speed KODAK ELITE Chrome 100 Film.

With high- and very-high-speed films, you can photograph in low-light conditions, obtain more depth of field, extend flash-distance range, or use a shutter speed fast enough to stop action or handhold the camera.

KODAK GOLD 400 Film offers high speed, medium sharpness, and very fine grain. KODAK ROYAL GOLD 1000 Film is a very high-speed film with medium grain, high sharpness, and medium resolving power. ELITE Chrome 400 Film (for color slides) offers high speed and the option of push processing to ISO 800.

Black-and-white films are a good choice for photographing subjects that are highly textured, detailed, or patterned. KODAK Technical Pan Film processed in KODAK TECHNIDOL Developer gives large-format performance from a 35 mm black-and-white film. The very high resolving power, extremely fine grain, and extremely high sharpness of KODAK T-MAX 100 Professional Film make it great for detailed subjects. The high speed of KODAK T-MAX 400 Professional Film will enable you to handhold your camera and stop action, and its extremely fine grain will yield excellent enlargements.

## EQUIPMENT

Beginning photographers are often fearful of close-up photography. They think it is difficult and that only professionals can take compelling photographs of flowers, insects, coins, and similar subjects. With an SLR camera and some close-up equipment, taking close-up photos is easy. Several devices can help you move in close for sharp pictures. They include supplementary lenses, close-focusing lenses, reversing rings, teleconverters, extension tubes, and bellows.

### Cameras

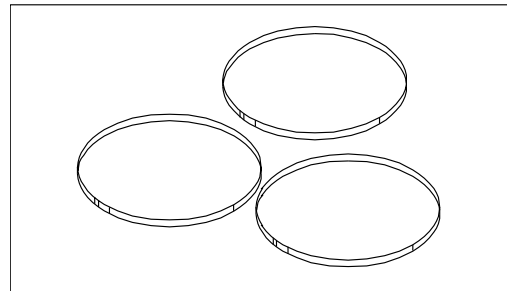
You can take close-up photos with just about any camera, but the 35 mm single-lens-reflex (SLR) camera is the easiest to use. It is the most popular and widely used camera because you see exactly what your camera sees. The SLR camera has through-the-lens (TTL) viewing and focusing systems. It is a very versatile camera that features interchangeable lenses that you can remove or attach easily and quickly. The SLR camera is also lightweight for easy carrying. Because SLR cameras have built-in meters behind the lens, they eliminate exposure calculations for most photography.

Some close-up photographers use larger-format cameras. The advantage is that the larger film size (120 or 4 x 5-inch film) requires less magnification than 35 mm film to make an enlargement of equal size. Therefore, the film grain of larger format film is less apparent in an enlarged print. Larger format cameras are excellent for photographing stationary objects. However, they are much heavier and larger than 35 mm SLRs, and you need a tripod to hold these cameras steady.

The immediate ancestor of the 35 mm SLR is the rangefinder camera. Most modern rangefinder cameras are autofocus. Rangefinder cameras are not well suited for close-ups. Close-up accessories are limited, and accurate framing of the subject is difficult. The rangefinder camera has a separate viewfinder located slightly higher than, and sometimes to one side of, the lens. Because you can't view the subject through the lens that takes the picture, you cannot tell exactly what will be in the picture. This problem is called parallax. You can correct for parallax by tipping the camera slightly in the direction of the viewfinder after you have composed the picture.

## Supplementary Lenses and Other Close-up Devices

**Supplementary Close-up Lenses.** The simplest devices for making close-ups are supplementary lenses. These lenses attach to your camera lens just as filters do. They are available in different powers such as +1, +2, and +3.



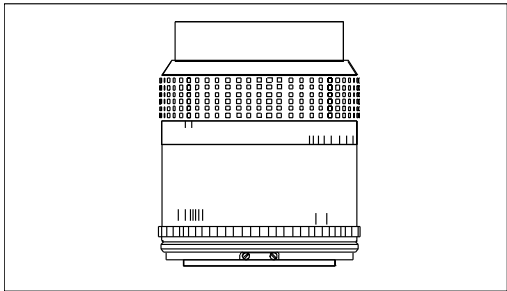
These varying strengths are called diopters. The larger the diopter value, the greater the magnification. With your camera lens set at infinity, a +3 lens gives you a focusing distance of about 13 inches.

You can use one or more of these lenses on your camera. No exposure compensation is necessary. Put the most powerful lens closest to your camera lens. If you link more than three of these lenses, the quality of your close-ups will suffer. You will get better sharpness if you use lens openings of  $f/8$  or smaller. Supplementary lenses are usually sold in inexpensive sets for use with most cameras.

Variable close-up lenses are a combination of various diopters all in one lens. A ring on the lens allows you to change the diopter without changing to, or adding, another lens.

The instructions that come with the lenses will tell you how to use them.

**Close-Focusing Lenses.** These lenses, also called macro or micro lenses, are specially designed for close-up photography. You can also use them for normal subject distances all the way to infinity. They range from 50 to 200 mm in focal length.



The focal length of a close-focusing lens determines the camera-to-subject distance needed to produce a particular image size. For example, the camera-to-subject distance needed to obtain a 1:1 image size with a 50 mm lens is 8 inches. With a 105 mm lens, it is 16 inches. Short focal lengths have a shorter working distance than long focal lengths. A short working distance is an advantage for close-ups of small or flat objects when you are working in a cramped area or have your camera mounted on a copystand. For outdoor close-ups, it is often better to have a longer working distance so that you have more space to move around in, set up equipment, and avoid casting shadows on or frightening your subject.

Close-focusing lenses require an exposure increase at close subject distances. However, your built-in meter will indicate the exposure required. If you use a non-dedicated flash or a separate exposure meter, you will have to calculate the exposure compensation yourself.

**Zoom Lenses.** A zoom lens has a range of focal lengths. It is the equivalent of several fixed-focal-length lenses. By adjusting the zoom ring of a 28 to 80 mm zoom lens, you can use any focal length between 28 and 80 mm. Most zoom lenses have a macro mode for close-up photography. For the photographer who wants a versatile, general-purpose lens, a zoom lens with a macro mode would be ideal. However, for critical close-ups, a zoom lens in the macro mode will not let you get close enough for a 1:3 magnification ratio. Also, it will not produce as sharp an image or have as flat an optical field over the entire frame as a fixed-focal-length macro lens designed for close-up photography.

**Reversing Rings and Teleconverters.** You can make good close-ups with your normal lenses by using these inexpensive devices. Reversing rings (available at most camera stores) allow you to reverse your camera lens. Because most lenses are asymmetrical (not identical power on both ends), you get greater magnification when you reverse them. A normal lens reversed and mounted on the

camera body will increase the lens magnification and project an image up to 2/3X onto the film.

Reversing many wide-angle lenses will give even more magnification, depending on focal length and design. Determine exposure by using your built-in meter.

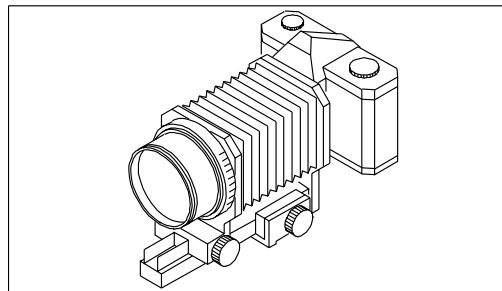
You can also reverse a short-focal-length lens onto a longer-focal-length lens by using a macro-coupling ring. This ring is threaded on both ends, one for the short lens and one for the long lens. The effect is similar to that produced by using an extension tube.

Teleconverters are multiple-element lenses that go between the camera lens and the body to increase the focal length of the lens. Reversing a normal lens onto a 3X teleconverter produces a 2X magnification. A 2X teleconverter will turn a 135 mm telephoto lens into a 270 mm lens. You can also use teleconverters with a long lens such as a 400 mm telephoto lens to magnify the image of distant subjects.

**Bellows and Extension Tubes.** These devices fit between the camera body and lens. Both extend the lens-to-film distance to permit close focusing. Depending on the lens extension you choose, you can obtain a wide range of magnifications and get high-quality, larger-than-life-size images.

Extension tubes are rigid rings of metal with no glass. They usually are sold in sets of three, which you can use separately or in combination. They are lightweight and relatively inexpensive.

A bellows unit is a flexible extension unit that is a precision instrument. You must use a tripod with a bellows unit to keep the camera steady.



Because an extension tube or a bellows unit moves the lens farther from the film, you must compensate for the light loss. The longer the extension, the greater the exposure increase must be. A built-in meter will indicate the exposure required, except when you use a non-dedicated flash unit. (See "Exposure Compensation.") High-speed films such as KODAK ROYAL GOLD 1000 and KODAK GOLD MAX 400 Film are excellent for use with an extension tube or a bellows attached to your camera. High-speed films allow you to use a higher shutter speed and a smaller lens opening for greater depth of field.

**Exposure Compensation.** When you extend the lens-to-film distance with bellows or extension tubes, less light reaches the film. If your camera has a built-in meter, it will automatically indicate the correct exposure. If your camera lacks a built-in meter, see the formula and table below or use the instructions that came with your close-up equipment.

To use the table, first calculate the magnification by using this formula:

$$m = \frac{d}{f}$$

m = magnification

d = length of bellows extension or extension tube in millimetres

f = lens focal length in millimetres

To determine a value for “d” measure the distance from the film plane to the front of the lens in millimetres. Take the distance measurement “d” and the lens focal length “f” and put them into the above formula.

For example if d = 77 mm and f = 55 mm, then

$$\frac{77}{55} = 1.4$$

Take 1.4, the value of “m,” and find it under magnification in the table below. Then multiply the shutter speed or increase the aperture by the number in the columns below the magnification.

EXPOSURE CORRECTIONS FOR EXTENSION TUBES OR BELLOWS															
Magnification															
	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
*Multiply Exposure Time by	1.4	2.0	2.6	3.2	4.0	4.9	5.8	6.8	7.9	9.0	10.2	11.6	13.0	14.4	16.0
–OR–															
Increase Aperture by (stops)	½	1	1¼	1¾	2	2¼	2½	2¾	3	3¼	3¼	3½	3¾	3¾	4

\* Fractions have been rounded to one decimal place.

## Electronic Flash

Electronic flash is ideal for many close-up subjects. Its short duration freezes subject motion and camera shake, and its bright light allows you to use smaller lens openings for more depth of field. Automatic and dedicated units are the most popular types available for 35 mm SLR cameras. Although both types connect to a hot shoe on the camera, use a sync cord for close-ups so that you can hold the flash off the camera and aim it accurately.

Automatic flash units are compatible with any 35 mm SLR camera. They have a built-in sensor that measures the amount of light reflected by the subject. When the sensor detects enough light for proper exposure, the flash stops emitting light. If you use bellows or extension tubes, you need to compensate for light loss (see “Exposure Compensation,” above).

A dedicated flash unit is designed to function with a specific SLR camera. With your autoexposure camera set on “P” or “A,” the flash will communicate with the camera and

set it to the proper shutter speed and aperture. Exposure is measured through the lens (TTL) or off-the-film (OTF) by a sensor at the film plane. When the sensor measures enough light for proper exposure, the flash is automatically shut off. Dedicated flash units greatly simplify close-up photography. Because most dedicated flash units measure light at the film plane, they automatically give the correct exposure with most close-up attachments.

You can diffuse electronic flash to eliminate glare on the subject by placing a thin white handkerchief over the flash. You also can bounce the light off a white reflector to achieve the same effect.

Flash mounted on the camera gives harsh frontal light. With the flash off the camera, you can change the angle to emphasize form and texture. Base exposure on flash-to-subject distance. With off-the-camera automatic flash, keep the sensor pointed at the subject. Dedicated flash units require a special cord designed for the particular model of flash you are using.

A ringlight is an electronic flash unit specially designed for close-up photography. It is a circular device that you can attach to the front of a lens, filter, or close-up lens with an adapter ring. A ringlight is so close to the lens axis that the light it emits is shadowless, and its compactness makes it easy to use in tight spaces.

Many photographers use flash outdoors. Depth of field will be greater because you can use a smaller lens opening. When you use smaller openings and fast shutter speeds, the background will go dark. This helps eliminate distractions. Flash also lets you use slow, fine-grained films.

You can also obtain pleasing close-ups outdoors without using a flash. Try using an aluminum-foil reflector to reflect light into shadow areas. Close-ups of flowers are enhanced greatly by back- and sidelighting. To compensate for the excess blue light from reflected skylight, you may want to use a No. 81A (yellowish) filter over your lens. Don't let an overcast day stop you from a close-up outing. Overcast skies provide soft, even lighting that is pleasing for many close-up subjects.

### Photolamps

For indoor close-ups, you can also use photolamps to illuminate your subjects. To get the correct color rendition when you use slide film with photolamp illumination, use a film such as ELITE Chrome 160T Film (Tungsten), which is balanced for 3200 K tungsten lamps.

### Other Accessories

Along with your choice of close-up equipment, you will need several accessories.

A tripod is essential for many close-up situations. It will hold the camera steady, allow you to use slow shutter speeds, and give you more accuracy in focusing and framing. A tripod that allows you to get close to the ground will be useful for outdoor close-up work.

A handheld light meter will extend the limited range of the built-in meters found in some SLRs.

A focusing rail will help you obtain the precise focus necessary for close-up photographs. The camera is mounted on the rail. A knob allows you to move the camera and lens smoothly, a millimetre at a time.

Some ordinary black or white posterboard is good for backgrounds. White poster board or aluminum foil makes an excellent reflector when you need to bounce light onto your subject. (See "Lighting.")

## TECHNIQUES

### Lighting

Basically, light can strike your subject from three directions.

Frontlighting strikes the front of your subject. This type of lighting is flat and reveals little texture.

Sidelighting comes from either side of the subject. It brings out texture and produces shadows. If you want to lessen the shadows, use a white cardboard or aluminum foil reflector to bounce light into those areas. Make sure the reflector does not show in your photograph.

Backlighting comes from behind the subject. Backlighting works well with translucent subjects such as leaves, revealing their intricate vein system. With an opaque subject, backlighting produces a silhouette.

### Depth of Field

The distance range between the nearest and farthest objects that appear in acceptably sharp focus is called depth of field. When you are photographing at a moderate or long distance, the depth of field is great. The greater the magnification, the shallower the depth of field becomes.

You will have no problem photographing a flat subject that is parallel to the film plane, because it has little depth. But a subject that has volume will require more depth of field.

Here are ways to increase depth of field in close-up photography:

1. Use a shorter-focal-length lens or increase the camera-to-subject distance, to produce a smaller image on the film.
2. Use a small aperture such as f/11 or f/16. This will also reduce the amount of light that reaches the film, so you may want to select a high-speed film, such as KODAK GOLD 400 Film. To use small lens openings with an autoexposure camera, change the exposure mode to aperture priority or manual.

Many close-up photographers use shallow depth of field to their advantage. You can focus sharply on one area of the subject, and let the rest of the photograph blur. This is called selective focus. The shallow depth of field emphasizes the subject by eliminating distracting backgrounds.

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## THE SUBJECT

Now that you know how to use your camera for close-up photography, let's look at the most important part of your photograph—the subject.

Photographing static subjects is fairly uncomplicated. You must deal with shallow depth of field and learn to control reflections. For practice, try making a close-up inventory of valuables in your home. This can be useful for insurance claims in case of fire or theft. Keep a photographic record of collections such as coins, stamps, gems, or miniature art objects. If you build models, try building background scenery for your miniatures and go to work with your close-up equipment.

In outdoor nature photography, you must learn to deal with motion. A fast shutter speed or electronic flash will stop the motion of animals. Try to confine your subject without upsetting or hurting it. A trip to a pond to capture a frog on film is much easier at night than during the day. Shining a flashlight on the frog will keep it immobile long enough for you to snap your close-up. Another consideration outdoors is the background. Don't be afraid to change your backgrounds. Add a stick, stone, or piece of bark. However, don't pick wildflowers; many are protected by law. When you have finished photographing, return everything you moved to its original place. You can make your own backgrounds for outdoor photography. Using flat-finish oils, spread natural colors such as brown and green, orange and yellow, and blue and green onto cardboard. Blend the colors together to give an out-of-focus effect. Your photographs will be exotic and exciting.

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