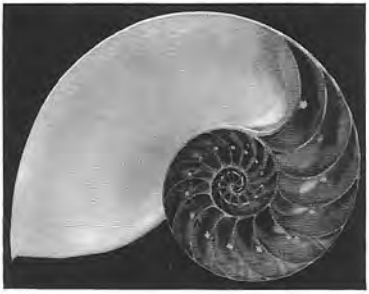
Close-Up Pictures with 35mm Cameras

AB-10



Close-up pictures of small objects such as flowers, shells, coins, and models, and of collections of small items, are interesting to shoot and exciting to see because close-ups reveal all the intricate detail of small things.

TABLE OF CONTENTS

GETTING IN CLOSE

You can take pictures from as close as 2 1/2 to 3 feet with most 35mm cameras, but for really dramatic close-up pictures you need to get even closer to your subject. You can take extreme close-ups by using close-up lenses, or if your camera is designed to accept them, extension tubes or bellows. Any of these aids will allow you to move in close enough to fill your picture area with small subjects.

USING CLOSE-UP LENSES

One advantage of using close-up lenses rather than lens-extension devices is that you use normal exposures. (Extension devices usually require more figuring.)

Close-up lenses come in different sizes (called "series") to fit different camera lenses. With most cameras, you'll also need an adapter ring to hold the close-up lens in place. Consult your camera manual to learn what series of close-up lens and adapter ring (if any) your camera needs. Your photo retailer can also measure your camera lens to determine what series of lens attachments it accepts. Eastman Kodak Company does not manufacture close-up lenses, but they are produced by other companies, including these:

Accura Ltd., 135-06 Northern Blvd., Flushing, N.Y. 11354
Ednalite Corp., 200 N. Water St., Peekskill, N.Y. 10566
Tiffen Optical Co., 71 Jane St., Roslyn Hts., N.Y. 11577

Close-up lenses are available in different strengths, or powers, such as 1+, 2+, and 3+. The higher the number, the stronger the lens and the closer you can get to your subject. You can use two close-up lenses together to work at even closer distances. For example, a 2+ lens and a 3+ lens equal a 5+ lens. When you use two close-up lenses together, the stronger lens should be closer to the camera. More than two lenses used together may result in poor image quality and may cut off the corners of the image.

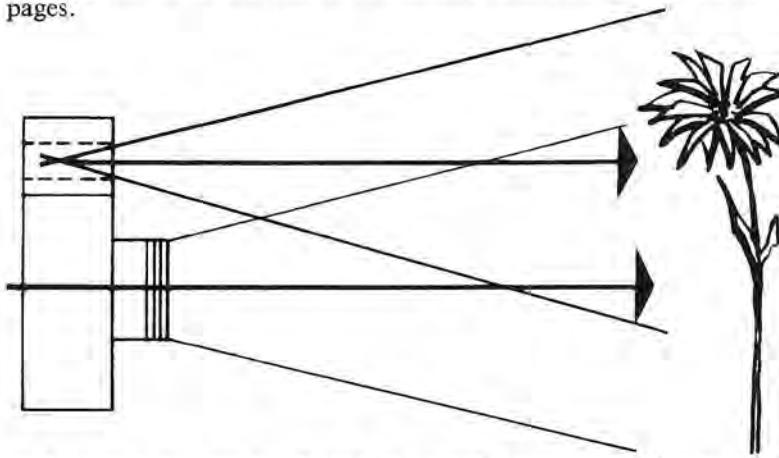
In close-up picture-taking, depth of field is very shallow. Since the range of sharp focus for a close-up lens may be only a fraction of an inch, focusing is critical for close-ups.

When you look through the viewfinder of a single-lens reflex camera, you're actually looking right out through the lens that takes the picture, and you can see whether the picture will be sharp and properly framed.

When you use close-up lenses on a non-reflex camera, you can't check the focus by looking through the viewfinder, so *it's important to measure the distance from the close-up lens to the subject.* Subject distances are listed on page 8. You can use a ruler to measure the

distance, but it's much easier to carry a piece of string which you have measured ahead of time. Tape or tie one end of the string to your adapter ring. Then tie a knot in the string at the correct focusing distance for each close-up lens and distance setting you plan to use.

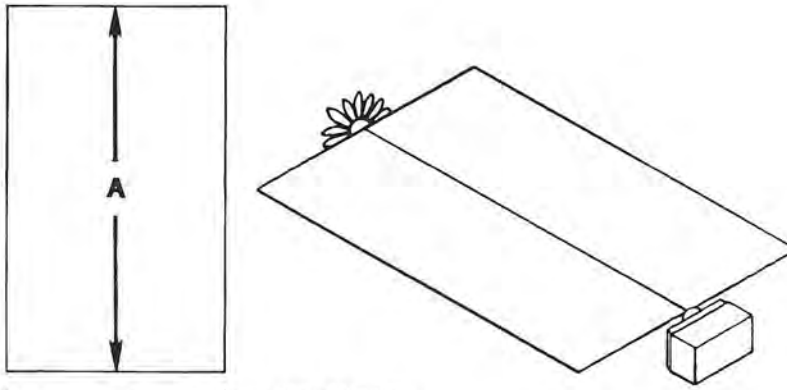
This method is simple and convenient for determining the proper shooting distance, but it doesn't show you what you'll get in the picture. At close shooting distances, the viewfinder doesn't show exactly what will be in the picture, because the viewfinder is located slightly higher than the camera lens. This phenomenon 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. The closer you get to the subject, the more you need to tip the camera in order to get in the picture what you first saw in the viewfinder. The best way to determine exactly what will be in your picture is to use one of the devices described on the following pages.



At close subject distances, the viewfinder of a non-reflex camera doesn't show exactly what you'll get in the picture.

Making a Cardboard Measuring Device

You can make a simple measuring device from a piece of cardboard. The cardboard that laundries put in shirts will work fine. See Table 2 on page 8 to find the correct subject distance and the field size for your camera lens, close-up lens, and focus setting. Measure and cut the cardboard and draw a line down the center as shown in the diagram on page 5. This cardboard will measure the subject distance and picture area for one close-up lens and focus setting; you'll need a different cardboard for each close-up lens and focus setting you plan to use.



A Subject distance
B Width of the area included in the picture at subject distance "A"

With the close-up lens on your camera, hold the cardboard straight out from the camera with the center line at the center of the close-up lens. Remember not to use the viewfinder to frame your picture. Line up your subject so that it just touches the end of the card and fits within the width of the card. Then drop the card and shoot the picture.

Making a Focal Frame

A focal frame is made from a piece of wood and a metal rod. The rod measures the distance to your subject and frames the area that will be in your picture. Each focal frame measures just one working distance and picture area, so you'll need a different focal frame for each close-up lens and focusing distance you plan to use.

A focal frame makes it easy to take good close-up pictures with any camera. Everything inside the metal frame will be in the finished picture.

To make the focal frame, you'll need some metal rod (3/8-inch aluminum stock is good), a hardwood board, and a few screws. If your camera has a 50mm lens or a 44 to 46mm lens, find the dimensions for your focal frame in Table 1. If the focal length of your lens isn't in the table, take a test picture of two yardsticks crossed at right angles at the proper distance from the close-up lens (see Table 2 on page 8). When you see the test picture, you will know the width (CC′) and height (BC and B′C′) that should make your frame.

For photographing three-dimensional objects, the focal frame is most practical if the focusing distance it measures is located slightly on the near side of the range of sharp focus. For this reason you should locate the frame about 10 percent closer than the recommended subject distance in Table 2. The dimensions in Table 1 do this for you. If you want the sharpest focus right at the frame position, as for copying pictures, set the focusing scale of your camera at 15 feet instead of infinity.

Mark the rod with a hacksaw or file at all the bending points (Table 1). To bend the rod, clamp it in a vise. Allow the mark to remain 3/16 inch out from the jaws. Bend the rod with a wrench (figure 1). Finish the bend with a hammer (figure 2). Follow these steps to make your focal frame:

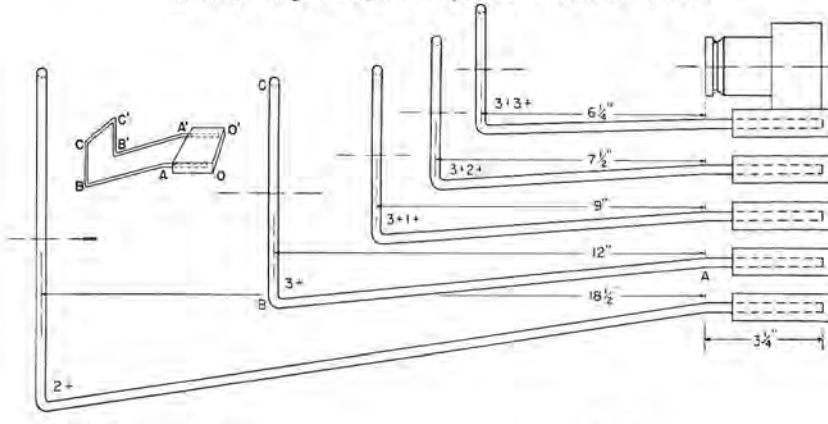
1. Bend A; check the angle against the drawing.
2. Bend B so that BC is at right angles to OA. Check with a square.
3. Bend a right angle at C. Check by standing angle C on the bench—AB should be in a vertical plane. Check with a square (figure 3).
4. Bend C′, B′, and A′ in the same manner as C, B, and A. Check in the same way. Ends O and O′ should be parallel and the distance between them should be equal to CC′.
5. Cut the wooden base to the outside dimensions (about 2 inches wider than the distance between C and C′) and sand it. Don't cut away an opening for camera-back release yet. Mark a center line across the top of the base.
6. Drill holes for the rod ends.
7. Force the rods into the holes, clamping the rod in a vise. Use a hammer and wood block for driving the base. Drive the rods alternately.
8. Clamp the base in a vise so that its length is level. Clamp a straight board across the base so that a line along the one edge comes where the lens axis will be.
9. Measure from this axis to the top bar of the frame (figure 4), and check against the table (this distance should be one-half of distance BC). Put a level on top of the top bar. Bend A or A′ up or down to make the top level.
10. Now finish the base and install four round-head screws to position the camera. Install a 1/4 x 20 stove bolt for a tripod screw to hold the camera (figure 5). Sink a 1/4 x 20 stove nut in the bottom of the base if you plan to use a tripod.

TABLE 1 Focal-Frame Dimensions in Inches for 35mm Cameras Focused at Infinity

	50mm LENS				44—46mm LENS			
Sup. Lenses	Total Length	AB A'B'	BC B'C'	CC' OO'	Total Length	AB A'B'	BC B'C'	CC' OO'
3+ & 3+	31 1/4	6 1/4	3 1/2	5 1/4	32 1/2	6 1/4	3 7/8	5 3/4
3+ & 2+	35 7/8	7 1/2	4 1/8	6 1/8	37 1/8	7 1/2	4 1/2	6 5/8
3+ & 1+	41 1/2	9	4 7/8	7 1/4	43 1/4	9	5 3/8	8
3+	52 5/8	12 1/8	6 1/4	9 3/8	54 1/2	12 1/8	6 3/4	10 1/4
2+	77 1/4	18 3/4	9 1/2	14 1/4	80	18 3/4	10 1/4	15 1/2

Lens axis is about 1 1/4 inches above the base. For all frames, OA and O'A' are 3 1/4 inches. Close-up lens-to-frame distances given on the drawing apply to all cameras.

Before bending the rod, mark all points at which it will be bent.



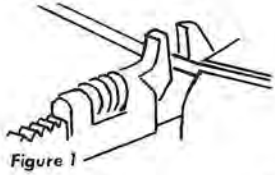


Figure 1

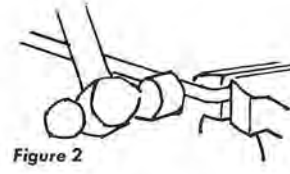


Figure 2

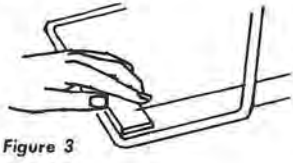


Figure 3

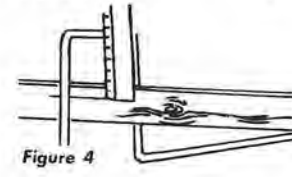


Figure 4

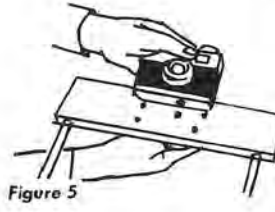


Figure 5

TABLE 2 Close-Up Lens Data

Measure the distance from the front rim of your close-up lens.

Close-up Lens and Focus Setting (in feet)		Lens-to-Subject Distance (in inches)	Approximate Field Size (in inches) Based on Picture Area of Slide	
			44-46mm Lens on a 35mm Camera	50mm Lens on a 35mm Camera
1+	Inf	39	20 x 29 3/4	18 x 26 3/4
	15	32 1/4	16 1/2 x 24 1/2	14 3/4 x 22
	6	25 1/2	13 x 19 1/4	11 3/4 x 17 1/4
	3 1/2	20 3/8	10 3/8 x 15 1/4	9 3/8 x 13 3/4
2+	Inf	19 1/2	10 1/8 x 15	9 x 13 1/2
	15	17 3/4	9 1/8 x 13 1/2	8 1/8 x 12
	6	15 1/2	7 7/8 x 11 3/4	7 1/8 x 10 1/2
	3 1/2	13 3/8	6 7/8 x 10 1/8	6 1/8 x 9 1/8
3+	Inf	13 1/8	6 3/4 x 9 7/8	6 x 8 7/8
	15	12 1/4	6 1/4 x 9 1/4	5 5/8 x 8 3/8
	6	11 1/8	5 5/8 x 8 3/8	5 1/8 x 7 1/2
	3 1/2	10	5 1/8 x 7 1/2	4 5/8 x 6 3/4
3+ plus 1+	Inf	9 7/8	5 x 7 3/8	4 1/2 x 6 5/8
	15	9 3/8	4 3/4 x 7	4 1/4 x 6 3/8
	6	8 5/8	4 3/8 x 6 3/8	4 x 5 7/8
	3 1/2	8	4 1/8 x 6	3 5/8 x 5 3/8
3+ plus 2+	Inf	7 7/8	4 x 5 7/8	3 5/8 x 5 3/8
	15	7 1/2	3 7/8 x 5 3/4	3 1/2 x 5 1/8
	6	7 1/8	3 5/8 x 5 3/8	3 1/4 x 4 7/8
	3 1/2	6 5/8	3 3/8 x 5	3 x 4 1/2
3+ plus 3+	Inf	6 5/8	3 3/8 x 5	3 x 4 1/2
	15	6 3/8	3 1/4 x 4 3/4	2 7/8 x 4 1/4
	6	6	3 1/8 x 4 1/2	2 3/4 x 4 1/8
	3 1/2	5 5/8	2 7/8 x 4 1/4	2 5/8 x 3 7/8

USING EXTENSION TUBES OR BELLOWS

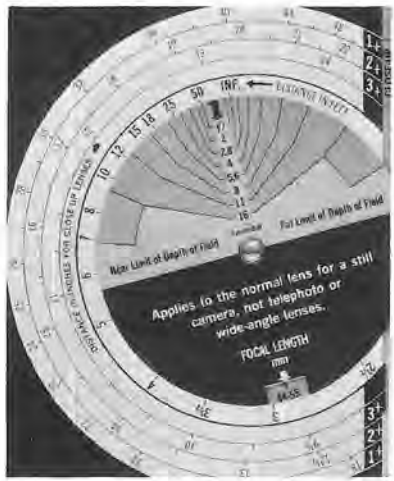
If your camera will accept extension tubes or bellows, you can make close-up pictures without accessory lenses. Extension tubes and bellows are usually used on single-lens reflex cameras, because with these cameras you can see exactly what will be in the picture and check the focus by looking through the viewfinder. However, when you use bellows or tubes, you'll need to increase the exposure to compensate for the "light loss" that results from the lens extension. To determine what exposure compensation is necessary, see the instructions packaged with the equipment, or use the Effective *f*-Number Computer in the *KODAK Master Photoguide,* KODAK Publication No. AR-21. This guide is available from photo retailers.

DEPTH OF FIELD FOR CLOSE-UP PICTURES

As we mentioned, depth of field is very shallow at close distances, so you should use a lens opening of *f*/8 or smaller when you shoot close-ups.

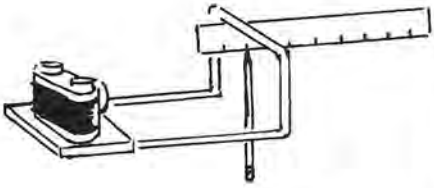
Usually the closest part of your subject should not be closer than the near limit of the depth of field, but the more distant portions of the subject can lie beyond the far limit. When the background detail is out of focus, it will not detract from the main subject.

The Depth-of-Field Computer in the *KODAK Master Photoguide* gives you the depth of field for various lens openings and subject distances with 1+, 2+, and 3+ close-up lenses.



Depth-of Field Computer from the *KODAK Master Photoguide.*

If you made a focal frame, you can also make a test to determine depth of field for your close-up equipment. Attach your camera to the focal frame, and slip the close-up lens over your camera lens. Set the lens at the opening you will be using for most of your close-up work. Position a ruler near one inside edge of the frame, as illustrated below, left. Point a pencil at the ruler in the plane of the frame, and take a picture. The results will indicate the area on the near and far side of the frame that will appear sharp in your close-ups.



LIGHTING AND EXPOSURE

Lighting and exposure are the same for close-up pictures as they are for general picture-taking, except when you use extension tubes or bellows. See page 9.

Daylight

You can determine your exposure for daylight close-up pictures by taking an exposure-meter reading or by using the exposure tables in the film instruction sheet.

Since the sun provides plenty of light, you can use the small lens openings you'll need for depth of field in your close-up pictures. Sidelighting will emphasize the shape and texture of your subject. Backlighting will show the translucent quality of subjects such as flowers. You can lighten the shadows to reveal more detail in your close-ups by using a reflector to bounce light into the shadow areas. A piece of white paper or some crumpled aluminum foil stretched over a piece of cardboard will make a good reflector.

Overcast days provide soft, even lighting, which is quite pleasing for many close-up subjects. On very dark days, when the lighting may not be bright enough for you to use a lens opening of *f*/8 or smaller, you may want to use flash.

Flash

When you use on-camera flash for close-ups, the subject is so brightly illuminated that you can use small lens openings to get the depth of field you need. Use one layer of white handkerchief over your flash to diffuse the light and to help you get proper exposure at close shooting distances. You can use the following tables for determining the exposure for your close-up flash pictures.

Flash Exposure Information for Close-Ups

This table applies directly to KODAK EKTACHROME-X, KODACHROME-X, and KODACOLOR-X Films. If you use KODACHROME II Film, Daylight Type, use a lens opening 1 stop larger than the table indicates. Put one layer of white handkerchief over the flash. With flashbulbs, use a shutter speed of 1/25 or 1/30 second. With electronic flash and leaf-type shutters, use any shutter speed.

Type of Flash (with one layer of handkerchief)	Lens Opening*	
	Subject Distance 10-20 inches	Subject Distance 30 inches
Flashbulbs		
Flashcube	f/16	f/11
AG-1B, shallow cylindrical reflector	f/16	f/11
AG-1B, polished bowl reflector	f/22	f/16
M2B, polished bowl reflector	f/22	f/16
M3B, 5B, or 25B, polished bowl reflector	f/22 with two layers of handkerchief	f/22
Electronic Flash		
700-1000 BCPS	f/16	f/8
1000-2000 BCPS	f/16	f/11
2800-4000 BCPS	f/22	f/16
5600-8000 BCPS	f/22 with two layers of handkerchief	f/22

*For very light subjects, use one stop less exposure or place two layers of handkerchief over the flash reflector.

If you can take your flash unit off the camera, you can get more interesting lighting. Hold the flash high and to one side of the camera at a 45-degree angle from the line between the subject and the camera. At this angle, the flash will create highlights and shadows which will help show the shape and texture of your subject. To figure the exposure for off-camera flash, measure the distance from the *flash to the subject.*

Photoflood Lamps and Movie Lights

You can use photoflood lamps or movie lights to illuminate your close-up subjects. To get the correct color rendition with this illumination, use the appropriate light-balancing filter for your film (see the film instructions), or use a film such as KODACHROME II Professional Film, Type A, which is balanced for photoflood illumination (3400 K). The best way to determine the exposure is to use an exposure meter.

If you have one light, place it high and to one side of the camera at a 45-degree angle from the line between the subject and the camera. With two lights of equal intensity, place the second light near the camera but farther away from the subject than the first light. This second light will illuminate the shadow areas.

Kodak

Consumer Markets Division • **Rochester, New York 14650**

Close-Up Pictures with 35mm Cameras — Minor Revision

KODAK Publication No. AB-10 PRINTED IN U.S.A. 77-3-70-BE