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Member Manual 4-H Photography

Adventures With Adjustable Cameras

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4-H Photography Program

Unit 1: *Adventures with Your Camera*

Unit 2: *Exploring Photography: Advanced Picture-Taking Techniques*

Adventures with Adjustable Cameras

Darkroom Techniques

Action! Making Videos and Movies

Advanced Skill Guides (pamphlets on building a darkroom, experimenting with your enlarger, portraiture, publicity photos, and using photo skills in your career)

4-H Photography Awards

County

Four Gold Medals of Honor in Photography

State

Expense-paid trip to National 4-H Congress

National

Six educational scholarships of \$1500 each. A scholar incentive grant of \$500 is given to national winners whose grades rank in the upper half of their class during the semester they use the \$1500 scholarship.

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Introduction

The World As You See It

Every time you take a picture, you make choices. What will be in the picture? Will you take the picture standing up or kneeling down? Photography is fun because it opens your eyes to choices. It lets you show things as *you* see them.

An adjustable camera gives many *more* choices than simple or automatic cameras. These choices will lead to new adventures in photography. Here are a few examples.

IF YOU WANT TO:	YOU CAN CHANGE:
Show different views of the same subject, including extreme close-ups.	Lenses
Take natural looking pictures in dim light without flash.	Exposures
Control how much of the scene is sharp in the pictures.	Lens openings
Stop action or use blurred pictures to suggest motion.	Shutter speeds
Take full advantage of different film speeds, including high-speed films for pictures in dim light.	Films

1 Your Camera

You have a 35 mm camera and want to take clear, colorful, snappy pictures. That's easy. In addition to the camera, all you will need is the camera's instruction book, this guide, some film and ... practice.

Getting to Know Your Camera

Check your camera's instruction book to answer these questions.

1. Does the camera have a built-in light meter?

(It is sometimes called an exposure meter.)

2. Does the camera need a battery?

Most light meters require batteries to operate. Check on that in the camera instruction book. Also, be sure the battery is fresh. If the battery is dead, the meter won't work and the pictures won't be good. If the battery is weak, the meter may work incorrectly. Most batteries last only about one year.

3. Does the camera have settings for "manual" (non automatic) operation?

4. Does the camera have a setting for "automatic" operation?

The simplest way to take pictures is to use an automatic camera that makes all of the settings for you. If your camera is not automatic and you wish it were — no problem. Load the camera with a film which has a film speed of 200 (an ISO number marked on the box), set the shutter speed setting at 125, the lens opening at $f/16$, and the focus at 11 feet. Now you can pretend it is a simple snapshot camera and start taking pictures with no further adjustments — but only take pictures in sunlight from 5 1/2 feet and beyond. Don't try shaded areas, cloudy days, or after dark. Those pictures will not turn out well.

If you want to take pictures under all of these different kinds of conditions, you'll have to adjust the camera settings. That is what this guide is all about, so read on.

Question: Why is it called a "35 mm" camera?

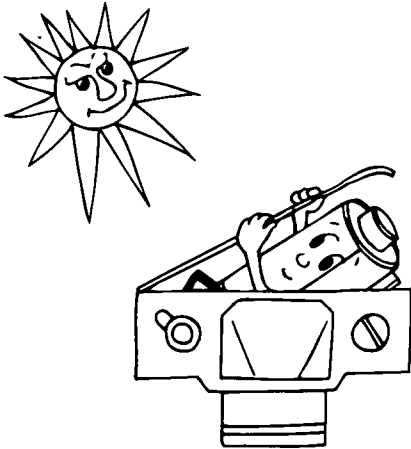
Answer: Because it uses 35 mm film. The "mm" stands for "millimeter."

Question: Why is it called "35 mm" film?

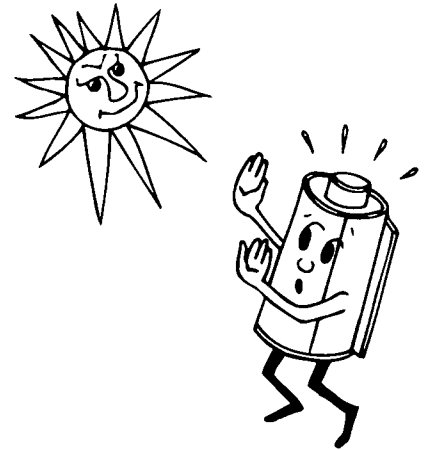
Answer: Because the area where each picture appears on the film is 35 millimeters wide.

2 Exposure

The most important part of taking a picture is the film. Film is very sensitive to light. When exposed to a tiny bit of light, film changes. It darkens at the spots where light touches it. That is why film comes in a metal container that keeps light away from the film until it is in your camera.



When you put film in your camera and close it, it is okay to start winding the film out of the metal container because the camera seals out light. When you take a picture, all you do is let just enough light in to record a nice, sharp picture on the film.



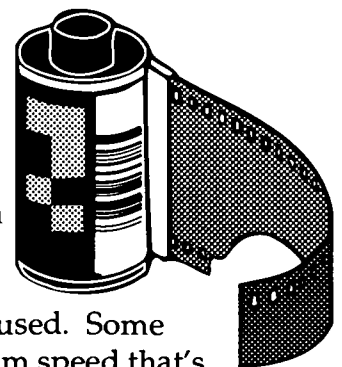
The amount of light you let in is called the "exposure." You have to set the camera properly to control the amount of light that gets into the camera.

All cameras have three basic settings that can change the exposure. They are:

- ☐ film speed
- ☐ lens opening
- ☐ shutter speed

Film Speed

How much light the film needs depends on its sensitivity to light or "film speed." High speed films need less light than slow speed films. The speed is indicated by an ISO number, which is usually included in the name of the film.



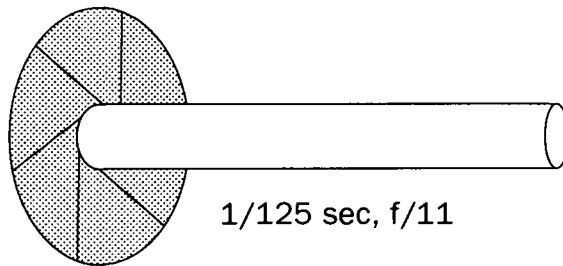
The light meter in your camera must know what kind of film is being used. Some cameras recognize films automatically. They read a special code for film speed that's printed on metal film containers. With other cameras, you must set the film speed before you start taking pictures. This setting is usually on the shutter speed dial.

Adjusting Exposure

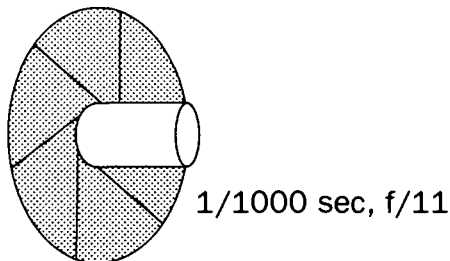
To get a good picture, you need to adjust the *shutter speed* and the *lens opening* settings to control the amount of light entering your camera.

The shutter speed controls the length of time the shutter will stay open to allow light to reach the film.

A slow shutter speed lets light in to expose the film for a long time.

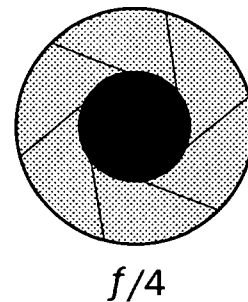


A fast shutter speed lets light in to expose the film for a short time.

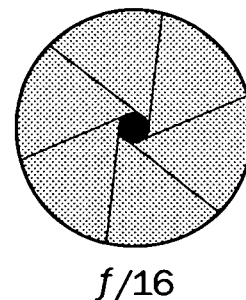


The lens opening controls how much light will enter the camera while the shutter is open.

A large lens opening lets in a lot of light.



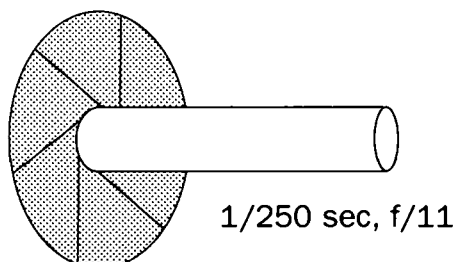
A small lens opening lets in a small amount of light.



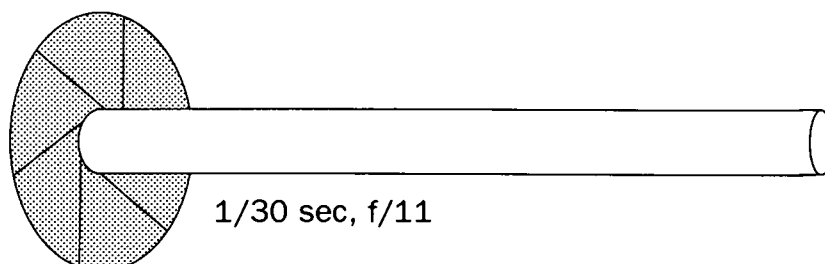
Exposure

To get good pictures, the film in the camera needs to be exposed to the same quantity of light for every picture.

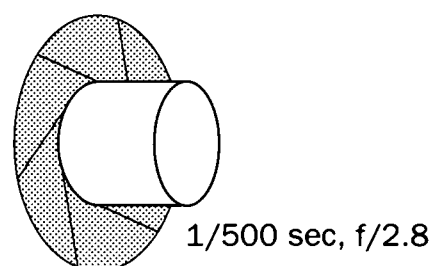
On a normal sunny day, you will use a fairly fast shutter speed and a medium lens opening so that the correct amount of light will reach the film and you will get a properly exposed picture.



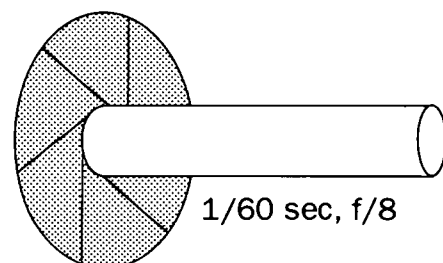
On a cloudy day, the light isn't as bright and you need to either let light into the camera for a long time,



or let in a lot of light for a shorter time.



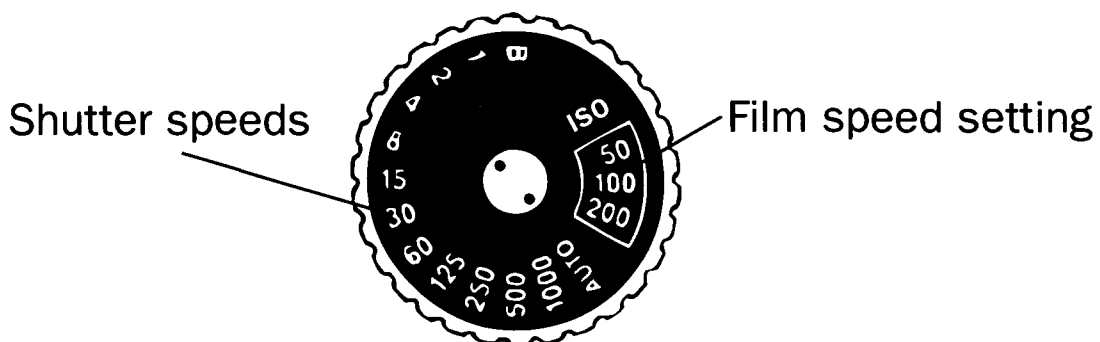
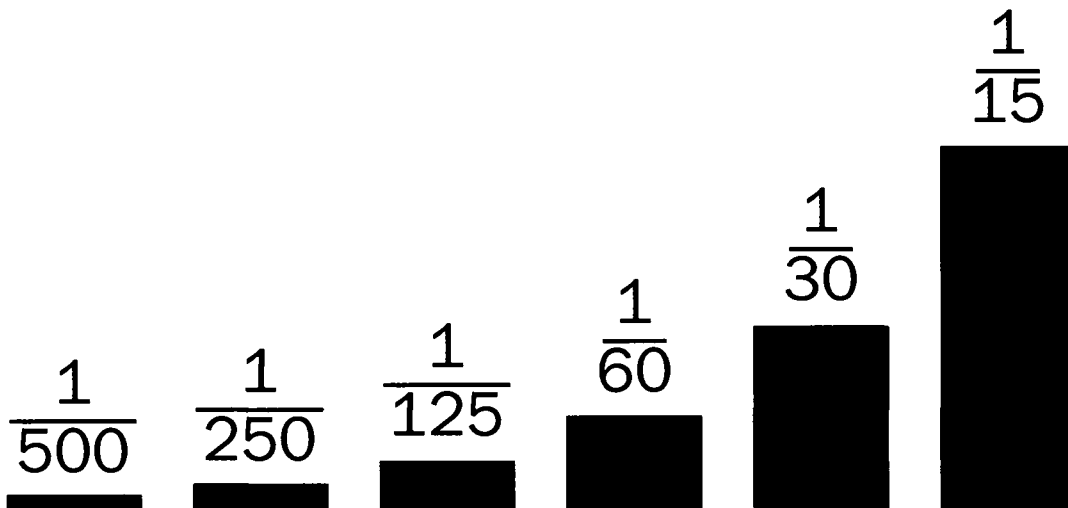
Or possibly both—a lot of light for a long time.



Shutter Speeds

Find the shutter speed settings on the camera and learn how to change them. Shutter speed settings are usually numbered 30, 60, 125, 250, 500, 1000.

The numbers refer to fractions of a second. 250 means the shutter will be open for 1/250th of a second. Each slower speed (1/125, 1/60, 1/30, etc.) lets light in twice as long as the one before it.



Changing the Shutter Speed

Adventures

The fun starts here!

Adventures are sprinkled through this manual. These simple exercises will show you how much you can do with your camera — and *how* to do it.

Adventure

YOUR MISSION: Watch the shutter in action.

Set the lens opening at its largest opening. Set the shutter at 30.

Now open the camera back. Be careful not to touch the inside of the camera or the surface of the lens. Hold the camera up and look into the lens through the open back of the camera. Press the shutter release and see how long light is let through the lens. The shutter was open for only 1/30th of a second.

Now advance the camera once and set the shutter speed at 250. Look into the lens and watch how fast the shutter works.

Compare several different settings. Try the B or T setting, if your camera has one, to see how it works. It keeps the shutter open as long as you hold down the shutter release.

Let's start taking pictures. CHOOSE ONE OF THESE TWO ADVENTURES. Only an adjustable camera will give you these pictures!

If you'd like some tips about how to load your camera, turn to page 34 at the back of this Guide.

Adventure

YOUR MISSION: Take a picture at night without flash.

SCENE: Try a picture of your house after sunset with all the lights on. Or try a downtown street at night.

The built-in exposure meter won't help, because it will see too much darkness. See the instructions that come with your film, or use the chart on page 18 of this manual.

Remember to focus carefully. Hold the camera very steady.

Adventure (Alternate)

YOUR MISSION: Make a time exposure at night.

SPECIAL GEAR: You need a shutter setting of "B" on the camera for this exercise. When set on "B," the shutter stays open as long as you keep pressing the shutter release.

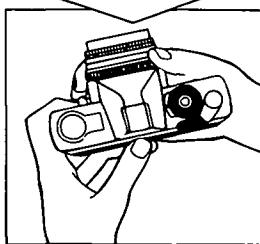
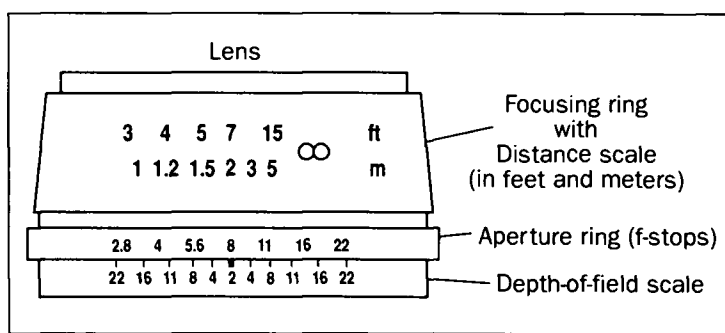
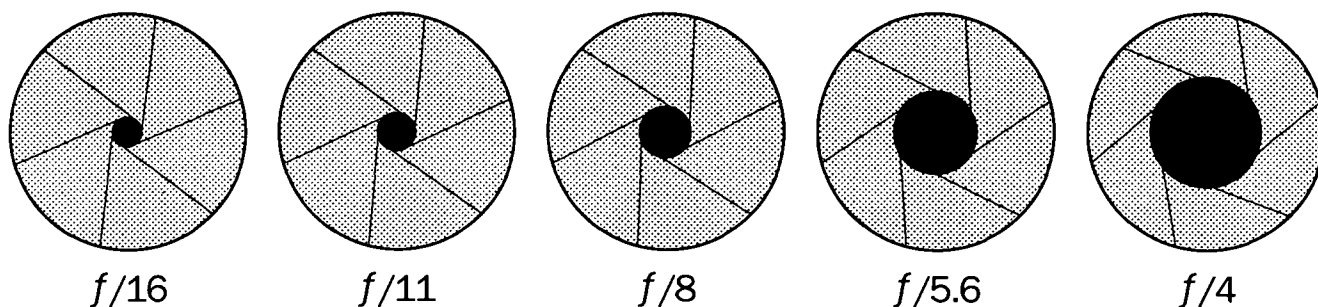
Put the camera on a tripod or set it on a solid surface so it doesn't move. Set the shutter at "B." Set the lens at its largest opening by turning the aperture ring to the last number on the right (it will be 4 or lower).

Have someone stand about 15 feet away and, with a flashlight pointing at the camera, make patterns in the air or write his or her initials or nickname (backwards) while you hold the button down.

Lens Openings

The lens opening is also called the “aperture.” A larger lens opening lets in more light. The size of the opening is changed by turning a ring on the lens. The numbers marked on this ring are called *f/numbers* or *f/stops*.

Just like the shutter settings, starting with the smallest lens opening (often *f/22* or *f/16*), each larger opening lets twice as much light into the camera as the setting before it.



Changing the Lens Opening

Adventure

YOUR MISSION: Watch the aperture in action.

Set the shutter at 1/2 second. Set the lens opening at its largest opening.

Now open the camera back, as in the first Adventure, and look into the lens through the open back of the camera.

Press the shutter release and notice how big the opening is when light comes through the lens.

Now set the lens at the smallest opening, advance the camera once and repeat the exercise. Notice how small the opening is. Compare several different settings to see how each larger opening lets in twice as much light.

Why Change Settings?

Lens openings and shutter speeds affect your pictures in many ways. For example, you can choose:

- ☐ a fast shutter speed to stop action (sports subjects, for example) ... or
- ☐ a small lens opening to keep more of the scene in sharp focus, from near to faraway (a person near the camera and mountains in the distance, for example).

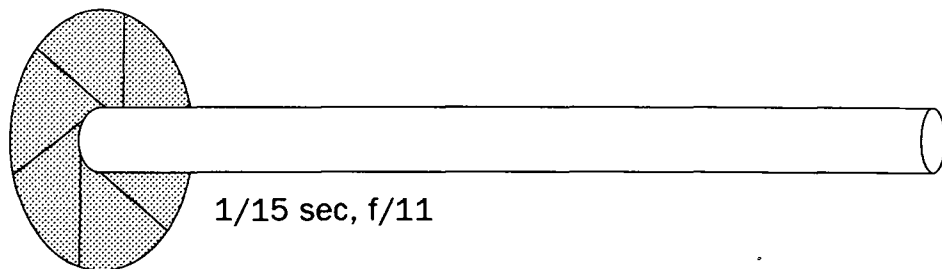
An adjustable camera lets you make those choices, then change your settings to keep the right exposure.

Keeping the Exposure Right

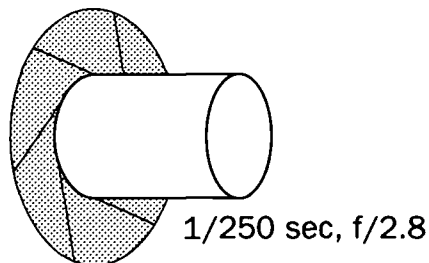
You can use several combinations of lens opening and shutter speed to get the right exposure.

The chart below shows numbers you will probably see on your camera. Each number is one step (or "stop") different from the one above or below. You can keep the same exposure by going up one column as you go down the other. Steps are equal on both sides.

LENS OPENING		SHUTTER SPEED
$f/16$		$1/500$
$f/11$	↖ ↗	$1/250$
$f/8$		$1/125$
$f/5.6$	↖ ↗	$1/60$
$f/4$		$1/30$
$f/2.8$	↖ ↗	$1/15$
$f/2$		$1/8$



is the same exposure as



THIS ADVENTURE REQUIRES SLIDE FILM AND IS OPTIONAL.

Adventure

YOUR MISSION: Keep the same exposure with different settings.

SPECIAL GEAR: Use a roll of *slide* film for this adventure. Bad exposures show up more on slides than prints. Exposures that are slightly off are adjusted when prints are made, so print film won't work for this exercise.

Set your shutter speed at 125, and find a subject which needs a lens opening of about $f/8$ for proper exposure. On bright days, you may need to shoot in the shade.

Take 5 pictures of this subject at different settings.

1. At 125 and $f/8$.
2. Set the shutter speed to the fastest setting on your camera (1/500th to 1/1000th of a second). Adjust the lens opening to get the right exposure.
3. Set the shutter speed at 30. Adjust the lens opening to get the right exposure.
NOTE: 1/30th of a second is the slowest shutter speed you can use and still get sharp pictures while handholding the camera. Use a tripod for slower speeds.
4. Set the widest lens opening on your lens (usually $f/4$ to $f/2.8$). Adjust the shutter speed to get the right exposure.
5. Set the smallest lens opening on your lens (usually $f/16$ to $f/22$). Adjust the shutter speed to get the right exposure.

Compare your slides. You can lean them against a window if you don't have a projector or a light-box. They should all have the same exposure. If some slides are lighter or darker, then you need to practice making adjustments.

3 Controlling Sharpness

Focusing

Focus is a basic camera setting that makes the subject sharp in your pictures. Whenever you look through a lens (a magnifying glass, for instance) you have to move it back and forth until the subject looks sharp. The same is true of your camera lens.

As you turn the focus ring on your camera, the lens moves back and forth bringing the subject in focus. If you are taking a picture of something ten feet away, set the camera focus for ten feet and take the picture. If the subject is 25 feet away, set the focus for 25 feet. If you are taking a picture of a scene, or a building, or anything that is more than 25 feet away, set the camera on infinity “∞.” At this setting, everything in the distance is in focus.

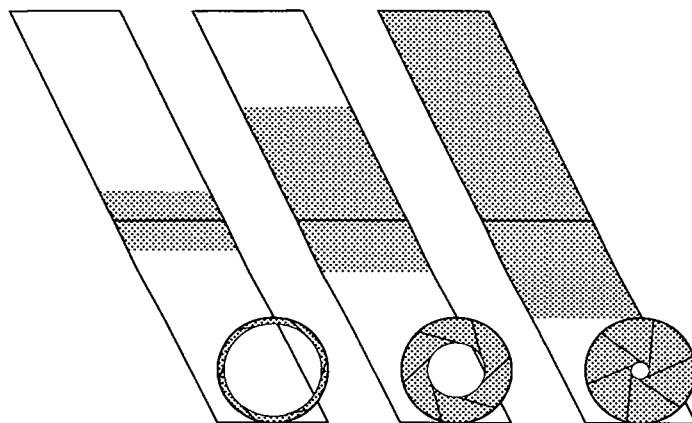
Lens Openings and Sharpness

We adjust the size of the lens opening to control how much light goes into the camera. The size of the lens opening also controls how much of the picture is sharp. A large lens opening makes a smaller portion of the space in the picture appear sharp.

Try the “Magic Pinhole Peeper” in the next *Adventure* (page 15) to see how lens openings change sharpness.

The camera works the same way. The smaller the lens opening, the more area of the picture that will be in focus.

This area of sharpness is called the “depth of field.” With large lens openings, the depth of field is short. With small lens openings, the depth of field is long.



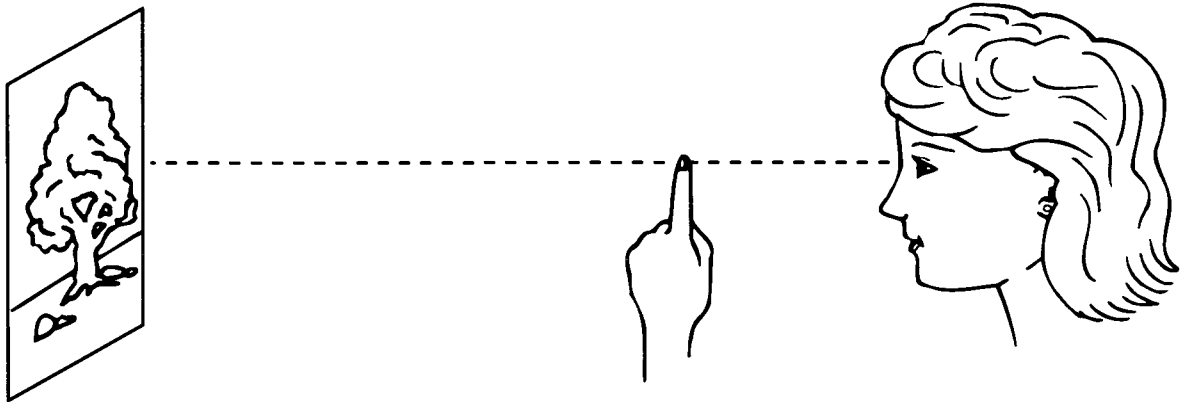
Adventure

Magic Pinhole Peeper → ◦

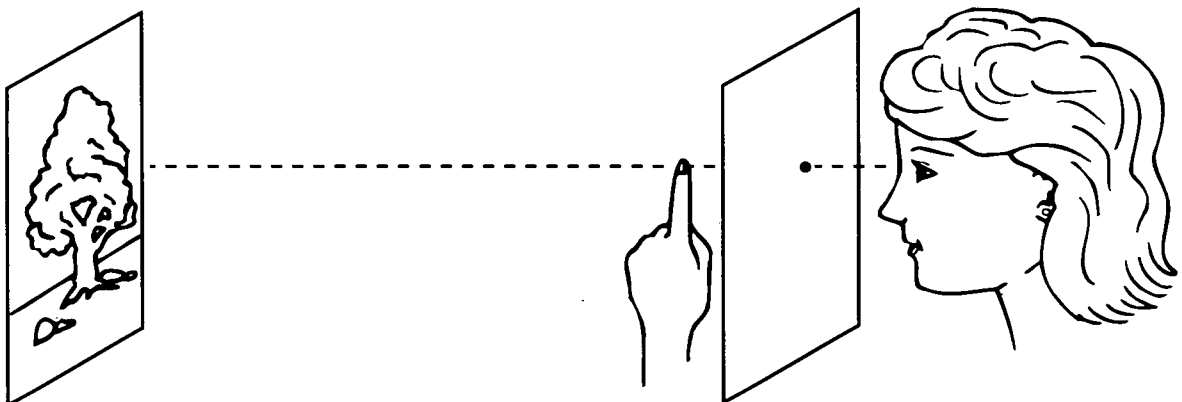
MISSION: To give your eye a greater area of sharpness using the magic pinhole peeper.

SPECIAL GEAR: Use a sharp pencil or other sharp object to punch a hole the size of the circle at the top of this page. You can punch the hole in this page or any piece of paper.

STEP #1: Look toward a picture or the wall across the room from you. Hold a finger up about a foot in front of you. Close one eye. With the open eye, try to focus on both the finger and the wall at the same time. You can't do this, because the lens opening of your eye is too large.



STEP #2: Now hold the pinhole peeper close to your eye so you can see through it. Look at your finger and the wall. Both are now in focus. The pinhole is smaller than the lens opening of your eye, which gives you a greater depth of field.



Using Depth of Field

When you understand depth of field, you can control which areas of the picture are sharp. You can keep the subject sharp and the background fuzzy. This calls attention to the subject. Distracting things in the background become blurred and people won't notice them.

You control depth of field by changing the size of the lens opening.

Adventure

MISSION: To control sharpness using lens openings.

THE SCENE: Select a daylight scene to photograph that has something near the camera as well as far away. Something near could be a tree branch or a person 5 or 6 feet away from the camera. Something far could be a house or a tree.

PICTURE #1: Set the lens at its largest opening ($f/2.8$ to $f/4$). Adjust the shutter speed to get the right exposure, or use the fastest shutter speed your camera has. Focus on the subject and take a picture.

PICTURE #2: Set the lens at its smallest opening ($f/16$ to $f/22$). Adjust the shutter speed to get the right exposure. Focus on the subject and take a picture.

RESULTS: The background should be out of focus in Picture #1 and sharp in Picture #2.

4 Natural Light

Shooting in Low Light

With a simple camera, only sunlight or flash will make good pictures. With your adjustable camera, you can take great pictures in all kinds of natural light, including “low light.”

- ☐ You can show the colorful lights of the midway at the county fair after dark. Flash can't cover that distance. (Remember, the light from a flash is good for a distance that's about the length of a car.)
- ☐ You can show your Christmas tree lights at night. Flash will overpower the colored lights on the tree.

Many examples of “low light” are listed on the next page, along with recommended exposures. If you use a different film speed, you will have to change the exposure.

Low light scenes can fool your light meter and give you poor exposures. Use the suggestions on the next page, or check the camera's meter reading against these guidelines.

Indoor lights may color the scene differently from what your eye sees. For example, the light bulbs in your house have more orange-yellow color than bright sunlight. Your eyes get used to the light quickly and don't notice the difference, but the film will see it. If you don't like the color in your prints, the processing lab can change the color slightly by making new prints using color filters. Slide films are special. There is no chance to adjust the color in printing. That's why you can choose slide films labeled for “Daylight” or “Tungsten” light (from household light bulbs).

Natural Light

SUBJECTS/SETTINGS	SUGGESTED EXPOSURE (ISO 400 FILM)	
Fairs, amusement parks	1/30 sec.	<i>f</i> /2.8
Inside the house at night	1/30 sec.	<i>f</i> /2.8
Indoors with fluorescent lights	1/60 sec.	<i>f</i> /4
Christmas lights (houses outdoors and trees indoors)	1/15 sec.	<i>f</i> /2
Brightly lighted streets	1/60 sec.	<i>f</i> /2.8
Neon signs	1/125 sec.	<i>f</i> /4
Floodlighted buildings, monuments	1/15 sec.	<i>f</i> /2
Skyline — Distant view of lighted buildings	1 sec.	<i>f</i> /2.8
Skyline — 10 minutes after sunset (the ideal time!)	1/60 sec.	<i>f</i> /5.6
Campfires, bonfires	1/60 sec.	<i>f</i> /4
Night outdoor sports (football, baseball)	1/125 sec.	<i>f</i> /2.8
Night indoor sports (basketball, hockey)	1/125 sec.	<i>f</i> /2
Stage shows		
— Average	1/60 sec.	<i>f</i> /2.8
— Bright	1/125 sec.	<i>f</i> /4
Circuses, ice shows		
— Broad floodlights	1/60 sec.	<i>f</i> /2.8
— Bright spotlights	1/250 sec.	<i>f</i> /2.8

Night Photography

Can you use a camera outdoors at night without a flash? If it's an adjustable camera, you can!

Night photography is fun. Load your camera with high speed film, and you can photograph lighted buildings, houses, neon signs, or reflections on wet pavement. Everything looks different at night, so the exposure doesn't need to be exactly right to get interesting pictures.

Moving the Moon with a Double Exposure

The moon is a nice addition to night pictures. You can move the moon so it's right where you want it to be — by double-exposing the picture.

To do this, you need a camera that lets you take one picture on top of another. Check your camera instructions to see if your camera can make a second exposure without winding the film.

Take one night picture without the moon. You need to remember where the dark sky is positioned. Then take a second picture looking up in the sky showing only the moon — so that it shows up in the dark sky of your first picture.

Try your own ideas for double exposures. Try double-exposing night lights and signs. Or put your friends on a television screen using a double exposure.

Sharp Pictures in Low Light

The number one danger with low light is fuzzy pictures. There are several reasons why special care is needed to take sharp pictures.

For good exposures as the light gets dimmer, you need:

- ☐ **larger lens openings**
- ☐ **slower shutter speeds.**

Larger lens openings have less depth of field. You must focus more carefully.

Slower shutter speeds can blur motion. When the whole picture is fuzzy, that means the camera was shaking during the exposure. When everything is sharp except the main subject, that means the camera was steady but the subject moved during the exposure.

Here are some tips for good pictures in low light.

- ☐ **Use a fast film.** Film speeds of ISO 400 or 1000 will let you use faster shutter speeds. That means you can hand hold the camera for many scenes.

Natural Light

- ☐ *Use a large lens opening.* Select your largest opening (smallest *f*/number) for most pictures. It allows you to use the fastest possible shutter speed, which gives you a better chance of stopping action in the scene.
- ☐ *Focus carefully.* Remember, you have less depth of field with a large lens opening.
- ☐ *Use a wide-angle lens.* It is easier to hand hold a wide angle lens without blurring the picture. You will learn why in Section 6.
- ☐ *Steady your camera.* Carry a tripod, if you have one. If not, set your camera on a solid surface (like a chair) for shutter speeds of 1/15th of a second or less.

Adventure

MISSION: To take sharp pictures in low light.

THE SCENE: Select scenes with 2 different types of lighting from the list on page 19.

Take pictures of the scenes you have selected. Make these pictures as sharp as you can.

5 Shutter Speeds

In the *Adventure* on page 20, you saw how fast shutter speeds help take sharp pictures in low light. In any kind of light, the choice of shutter speed helps you control how your pictures look by freezing or blurring motion.

Stopping Time and Action

Every picture freezes time. Shutter speeds of 1/250 and faster can also freeze fast action in a sharp, clear picture. Fast shutter speeds have another advantage of reducing the effect of camera movement, so more of your pictures will be sharp.

High speed films of ISO 400 or 1000 are best for stopping fast action. Fast films allow you to use faster shutter speeds.

Direction of Motion

When motion is coming straight at you or away from you, it is easier to stop action. You can use a slower shutter speed than for motion that moves across (left to right or right to left).

Motion is also magnified as it gets closer. The closer you are to the action, the faster the shutter speed you'll need to freeze it.

Blurring Motion and Backgrounds

How do you add "feeling" to pictures? One way to give the feeling of fast-moving action is to take a blurred picture on purpose. A medium or slow shutter speed will blur motion.

You can also try panning with the action. Follow action that moves across your field of view with the camera. Snap the picture while you're turning. The subject will look sharper than the blurred background.

Try starting with 1/30th of a second for blurring and panning. Then experiment. The effect depends on the speed of the shutter *and* the speed of the action.

Waterfalls and flowing streams have a soft "cotton-candy" feeling when you blur the motion with a slow exposure. You'll need a shutter speed of 1/15th of a second or slower to get this effect. Use a tripod or some other support to keep the background sharp.

Shutter Speeds

Adventure

MISSION: To stop action using fast shutter speeds.

SUBJECT: An action scene that you can control, like a friend riding a bicycle or skateboarding.

SETTING #1: Set the camera at the fastest shutter speed. Then adjust the lens opening for the proper exposure.

Take pictures showing the action:

- ☐ moving straight toward you,
- ☐ moving slowly across, left to right,
- ☐ moving very fast from right to left,
- ☐ close up, and
- ☐ far away.

SETTING #2: Set the shutter speed at 1/30th of a second. You may need to move the subject into a shaded area to use this slow shutter speed.

Take the same 5 pictures again. Be careful to hold the camera steady.

Compare the pictures to see how shutter speed can control motion.

Long Exposures

Carnival rides, fireworks, and moving cars make colorful streaks of light when you use long exposures. These are called "time exposures," because you have to leave the shutter open for many seconds. Try the next *Adventure* to learn how!

Adventure

MISSION: To create blurred motion of "star trails" and "car trails" at night using time exposures. ("Trails" are streaks of light that show patterns of movement.)

SPECIAL GEAR: A tripod and a cable release.

SCENE #1: You need a clear *night sky* when you can see stars. Use a wide angle lens and focus on infinity. Position the camera (on the tripod) to include lots of sky. Try to include a tree or unlit building in the foreground. Keep lights from houses or cars out of the scene.

Connect the cable release to the shutter release on the camera. Set the shutter speed at "B" (bulb). Set the lens opening to $f/2.8$.

To take the picture, press the cable release and lock it to hold the shutter open. After exposing for 10 minutes, unlock the cable release to close the shutter.

SCENE #2: Find a safe place to photograph *night traffic* from a bridge or other high place. Position the camera (on the tripod) to show a long stretch of well-traveled highway. Street lights can be included.

Connect the cable release. Set the shutter at "B."

Set the lens opening to $f/22$.

Press and hold the cable release for 10 seconds, then release it.

Your pictures will show trails of light.

6 Lenses

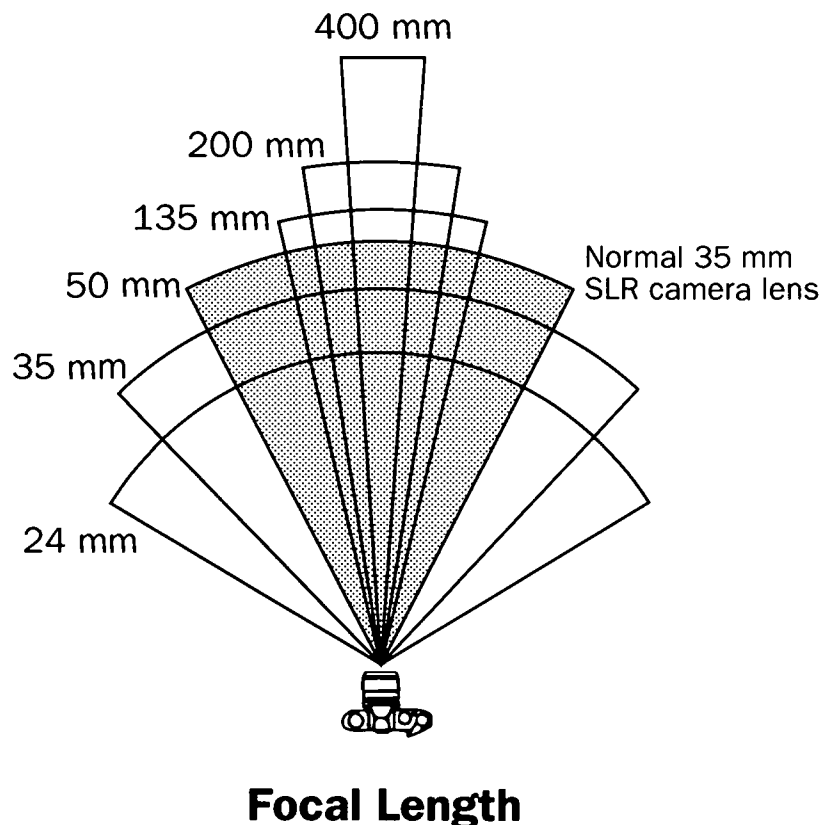
Changing Your Point of View

An advantage of adjustable cameras is the ability to use different lenses. They change your view of the subject.

The standard or “normal” lens on 35 mm cameras is about 50 mm. It sees things the way your eye does.

Telephoto lenses make the subject larger. Wide angle lenses make the subject smaller and show a much wider area.

Lenses are identified by “focal lengths,” expressed in millimeters (mm).



How Big is the Lighthouse?



24 mm Lens



50 mm Lens



200 mm Lens

These lenses give three different answers. To keep the man the same size with these three lenses, we had to move back from 10 feet to 20 feet to 80 feet. Changing the distance from the subject changes the "perspective" (the size of things compared to one another).

Adventure

MISSION: To see how focal length changes the angle of view.

Cut a round hole about 2 inches wide in a piece of paper. Look through the hole at arms length. Move the paper closer and closer to your eye.

Your eye is the film and the hole is the camera lens. The distance between your eye and the hole is the focal length.

The closer your eye gets to the hole, the more you see on the other side. The same is true for a lens. The closer it can get to the film, the wider its angle of view will be.

Normal Lenses

What you see with your eye is what the picture will show when using a normal lens. Distances and sizes look natural from foreground to background.

Lenses

The largest lens opening (“maximum aperture”) is often larger than you find on other lenses. Some have $f/1.8$ and even larger lens openings. These so-called “fast lenses” are an excellent choice for low light photography.

Wide Angle Lenses

For a broad view of the Grand Canyon, you will want a wide angle lens. It includes more of the scene than a normal lens without moving the camera. It is also ideal for interior scenes, where you want to show a big area but don’t have room to back up.

Sharpness is another advantage. Their large depth of field makes it easy to get sharp pictures with these lenses.

As shown on page 25, a wide angle lens exaggerates the distance between near and far objects. This brings an added feeling of depth to your pictures. However, at very close distances, objects can look distorted. You can put a giant nose on a friend by taking a close-up picture with a wide angle lens.

If you tilt the camera up or down to take a picture of a tall building, a wide angle lens will make the parallel lines converge, changing the shape of the building. To keep parallel lines parallel with wide angle lenses, you have to keep the film plane (camera back) parallel with the surface of the building.

Telephoto Lenses

Telephoto lenses of 85 mm to 105 mm are perfect for portraits of people. Their limited depth of field becomes an advantage. You can keep the background fuzzy to focus attention on the person.

These lenses are great for “candid” shots — natural, unposed pictures of people involved in activities. Telephoto lenses magnify the scene, so you can stand farther away and avoid interrupting the action.

Telephoto lens of 200 mm and longer are ideal for photographing sports and wildlife. For these subjects, magnification is important. A 200 mm lens makes the subject 4 times bigger than a 50 mm lens. As you can see on page 25, a telephoto view also makes objects that are far apart seem closer to each other.

Hand Holding and Telephoto Lenses

Telephoto lenses magnify motion as well as subjects. To understand this, try an experiment. Hold a short stick steady using one hand. Seems easy, doesn't it? If the stick wiggles a little, you don't notice it. Now hold a very long stick steady using one hand. Watch the end wiggle.

This is why telephoto lenses and tripods make a good combination. The tripod helps you take pictures that are rock-steady.

Don't hand hold a camera with a telephoto lens unless you use a fast shutter speed. The shutter speed should match the number in the focal length of the lens. Minimum shutter speed for hand holding a 500 mm lens is 1/500th of a second.

Zoom Lenses

These are the most convenient lenses. With a zoom lens, you can make the subject smaller or larger by adjusting the lens. You don't have to move yourself or the camera. You don't have to change lenses, either. Just zoom in for a close-up, or zoom back for a wider view. In effect, a zoom lens is many lenses in one.

There are 3 main differences between zoom lenses (and their costs): *Range* of focal lengths, *Sharpness*, *Speed* (maximum aperture).

LENS SHADES

A lens shade or "hood" attaches to the front of a lens. It blocks out stray light that creates "lens flare," especially when the lens is pointed in the general direction of the sun. Stray light can steal some of the brightness and snappiness from your pictures.

A shade made for a wide angle lens will not work for a telephoto lens. You need to use a shade designed for the focal length of each lens.

If you don't have a shade, you can reduce lens flare by blocking light with your hand. Be sure your hand is out of the picture.



8 Close-Up Photography

Discovering Details

Move in close, and a white frosted cake becomes a winter wonderland with snow-covered hills and valleys. A lizard becomes a towering dinosaur. A baseball grows as big as a globe. A spider web becomes a giant maze.

Close-ups reveal a world often overlooked. The most popular close-up subjects are found in nature — flowers, insects, leaves, dew drops on grass. Photography helps you to see the beauty in tiny details — and enlarge that beauty in your pictures.

Normal lenses will move you close enough for many pictures. However, you need special tools to fill the picture with very small subjects — like a single flower. A macro lens is specially designed for close focusing. You can also move within inches using close-up lens attachments. These inexpensive glass lenses screw onto the front of your camera lens to magnify the subject.

Adventure

MISSION: Take close-up pictures in your yard or neighborhood.

SPECIAL GEAR: Not required. Use close-up attachments if you have them.

Read the tips on page 29. Use them for 2 close-ups.

Then find 3 other subjects. You can borrow fruits or vegetables from the kitchen and photograph them outdoors. Look for patterns in wood, tree bark, stone, or metal. Use any subject you like.

To take sharp close-ups, you need to pay special attention to:

- ☐ depth of field
- ☐ motion of the subject.

Depth Of Field In Close-ups

In section 4, you learned about depth of field. Depth of field decreases as you move closer to the subject. Think how small that range will be when the subject is only *inches* away from the camera. The range of sharpness may be just an inch or two.

To extend that range, use the smallest lens opening you can. Be sure to press the depth of field preview button if your camera has one, so you can see exactly what's in focus and out of focus.

Motion In Close-ups

Motion can be a problem outdoors in the wind. You know that moving closer magnifies both the subject *and* motion, too. At a distance of several inches, a slight breeze looks like a hurricane.

One solution is to use a faster shutter speed. But this will decrease the depth of field, because you have to use larger lens openings to keep the right exposure.

The best solution is to prevent the motion. One way to do that is described below.

Adventure

MISSION: Use close-ups to create "mystery pictures."

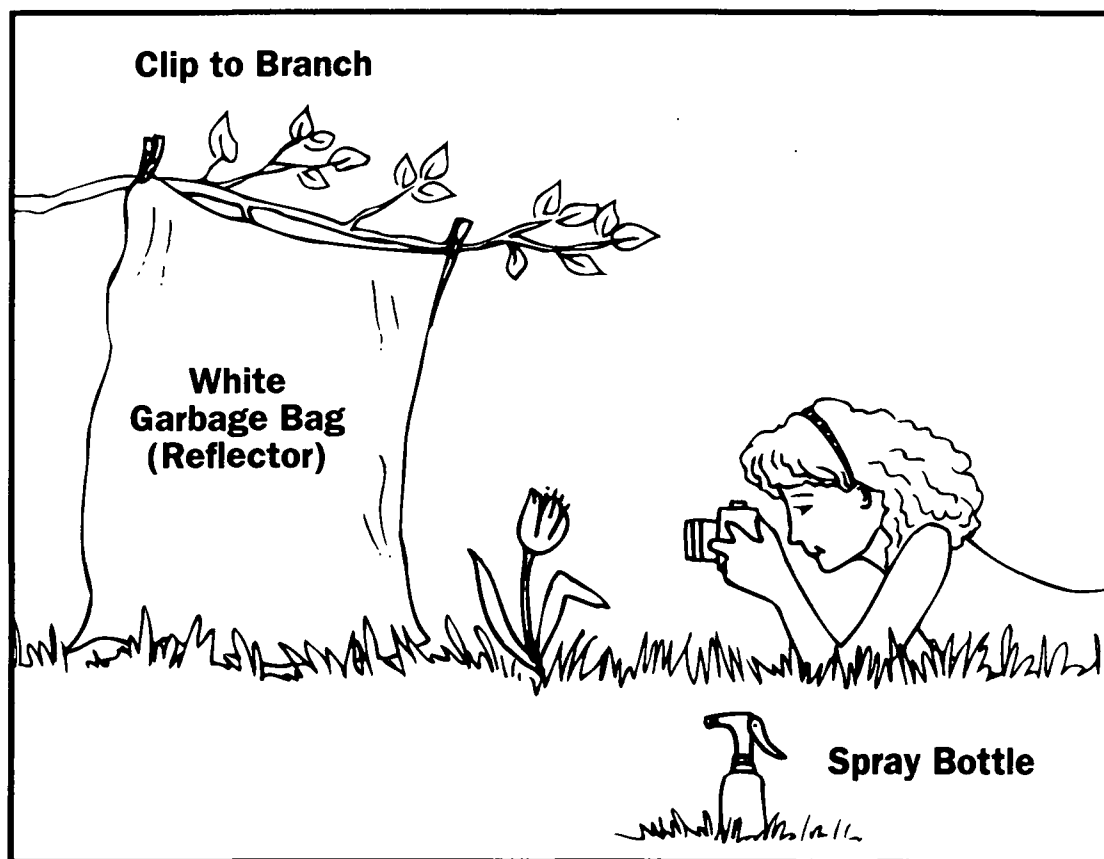
SPECIAL GEAR: Not required. Use close-up attachments if you have them.

Take pictures of three ordinary objects, but take these pictures so close that you can barely recognize what the objects are. See if you can mystify your friends. ("Is that part of an orange? Or is it a basketball?")

Tips For Better Close-ups

A few simple tricks can improve your close-ups of flowers and plants.

- ❑ **A Card or Plastic Bag to Stop the Wind.** To block the breezes, carry along a card or garbage bag and clothes pins. Use the clothes pins to clip the bag to surrounding branches. With a subject that doesn't move, you can use smaller lens openings for more depth of field. A white card or garbage bag can also be used as a reflector, to bounce light into dark areas.
- ❑ **A Portable Background.** Any dark piece of cloth can become a background. Place it behind a flower to make the colors stand out.
- ❑ **A Spray Bottle.** Dewdrops add a fresh, inviting look. You can make your own dew. Just spray water onto flowers, plants, or blades of grass.



Glossary

Adjustable camera

A camera with manually adjustable distance settings, lens openings, and shutter speeds.

Aperture

(lens opening) The opening in a lens system through which light passes. Simple cameras have preset lens openings. Adjustable lens openings are usually calibrated in f-numbers marked on the lens.

ASA number

A rating of a film's sensitivity to light (SEE **Film speed**). Same as ISO. ASA is the American Standards Association which approves the ratings.

Automatic camera

A camera with a built-in exposure meter that automatically adjusts the lens opening, shutter speed, or both, for proper exposure. Focus adjustments are also automatic on some cameras.

Background

The part of the scene that appears behind the principal subject of the picture.

Cable release

A flexible cord with a metal plunger inside. It attaches to a camera's shutter release. Pressing the plunger trips the shutter gently to reduce the danger of camera movement during slow shutter speeds. Some have a "locking" device to keep the shutter open for time exposures.

Close-up

A picture taken with the camera close to the subject.

Composition

The arrangement of all elements in a picture: main subject, foreground, background, and supporting subjects.

Darkroom

A light-tight area used for processing films and for printing and processing photographic papers.

Depth of field

The distance range which is in sharp focus. It varies with different lenses, lens openings, and subject distances. Simple cameras often use wide angle lenses and small lens openings to allow a depth of field from 4 feet to infinity (as far as you can see — and farther) so you don't need to adjust the focus.

Double exposure

Two pictures taken on one frame of film, or two images printed on one piece of photographic paper.

Emulsion

A thin coating of light-sensitive material, usually silver halide in gelatin, in which the image is formed on film and photographic papers.

Existing light

(available light) In photography, the term refers to pictures taken by dim light rather than flash. Existing light pictures are normally taken with adjustable cameras and exposed by room lights, street lamps, spotlights, daylight through windows, or the twilight sky outdoors.

Expiration date

A date printed on film boxes. You cannot rely on good results if you use the film past this date. Like food, film will spoil after a long period of time.

Exposure

The amount of light which reaches the film inside the camera. Two controls that change the exposure with adjustable cameras are the lens opening (size) and the shutter speed (time).

Glossary

Exposure meter

(light meter) An instrument used to determine the exposure setting. It contains a light-sensitive cell that measures the light reflected from or falling on a subject.

Exposure setting

The lens opening and shutter speed selected to expose the film.

Fast film

A film that is very sensitive to light. It needs less light to expose a normal print. It is ideal for shooting in dim light or for stopping fast action.

Fill-in light

Additional light from a lamp or reflector used to soften the shadows caused by the main light source.

Film

A photographic emulsion coated on a flexible transparent plastic base. Basic differences among the many color films available include the following.

- Film type (film for prints or slides)
- Film size (35 mm, 110, disk film, and others)
- Exposures per roll (normally 12, 24, or 36)
- Film speed (ISO 100, 200, 400, 1000 and others)

Film speed

The sensitivity of a given film to light, indicated by a number such as ISO 200. The higher the number, the more sensitive (or “faster”) the film. Higher-speed films produce best results in dim lighting, while lower-speed films produce best results in bright lighting.

Filter

A colored piece of glass or other transparent material used over the lens to emphasize, eliminate, or change the color or density of the entire scene or certain elements in the scene.

Fixed-focus lens

A lens that has been focused in a fixed position by the manufacturer. The user does not have to adjust the focus of the lens.

Flash

A brief, intense burst of light produced by a flashbulb or electronic flash unit, usually used where the lighting on the scene is too dim for picture-taking.

Flat lighting

Lighting that illuminates the subject evenly, with few shadows and little difference between bright and dark areas.

***f*-number**

A number used to indicate the size of the lens opening. They are marked on lenses used with adjustable cameras. Common *f*-numbers are *f*/2.8, *f*/4, *f*/5.6, *f*/8, *f*/11, *f*/16, and *f*/22. The larger the *f*-number, the smaller the lens opening. In this series, *f*/2.8 is the largest lens opening and *f*/22 is the smallest. (SEE **Exposure**)

Focus

Adjustment of the distance setting on a lens to sharply define the subject.

Foreground

The area between the camera and the principal subject.

Highlights

The brightest areas of a subject or picture.

Infinity

A focusing symbol [SHOW SYMBOL] and setting. At this setting, all distant objects will appear in focus.

ISO number

A rating of a film's sensitivity to light (SEE **Film speed**). Same as ASA. ISO is the International Standards Organization which approves the ratings.

Lens

One or more pieces of optical glass or similar material designed to collect and focus rays of light to form a sharp image on the film, paper, or projection screen.

Lighting

The illumination falling on a subject, particularly the direction or control of the illumination.

Negative

The developed film that contains a reversed-tone image of the original scene. Negatives are used to create prints.

Overexposure

A condition in which too much light reaches the film, producing a dense negative or a washed-out print or slide.

Panning

Moving the camera to follow the action.

Parallax

The difference between the picture you see and the picture you take, as shown in the "Camera Control" section of this manual.

Print

A positive picture, usually on paper, and usually produced from a negative.

Processing

A procedure during which exposed photographic film or paper is developed, fixed, and washed to produce either a negative or positive image.

Reflector

Any device used to reflect light onto a subject.

Self-timer

A delayed automatic shutter release built into some cameras. The time delay allows the photographer to move into the picture.

Shutter

Blades, a curtain, a plate, or some other movable cover inside a camera which controls the time during which light reaches the film.

Silhouette

A picture which shows the subject as a shadow, outlined against a lighter background.

Simple camera

A camera that has few or no adjustments to be made by the picture-taker. Usually, simple cameras have only one size of lens opening and one or two shutter speeds and do not require focusing by the picture-taker.

Single lens reflex (SLR) camera

A camera that allows you to view the scene through the lens that takes the picture. Inside the camera, a mirror flips down in front of the film to reflect the scene into the viewfinder.

Glossary

Slide

A photographic transparency mounted for projection. The processed slide film is the final (positive) "picture," unlike negative film which requires printing to create a (positive) "picture."

Slow film

A film that requires lots of light to expose a normal print. It is sharper than fast film, so it is ideal for enlargements.

Soft lighting

Lighting that is low or moderate in contrast (the difference between light and dark areas in the scene).

Special effect

Any technique used to make pictures look different from normal. Filters are a common way to create a special effect.

Telephoto lens

A lens that makes a subject appear larger on film than does a normal lens at the same camera-to-subject distance. It has a narrower field of view (includes less subject area) than a normal lens.

Time exposures

Exposures longer than one second or any exposure using the "B" (bulb) setting on the shutter dial. The "B" setting keeps the shutter open as long as the shutter is held down.

Transparency

A positive image on film, viewed or projected by transmitted light (light shining through the film) unlike prints, which are viewed by reflected light (light bounced back from the surface of the print).

Tripod

A three-legged supporting stand used to hold the camera steady.

Tungsten light

Light from regular room lamps and ceiling fixtures, not fluorescent.

Underexposure

A condition in which too little light reaches the film, producing a dark slide or a muddy-looking print.

Vignette

In photography, a special effect which creates a soft edge and a light border around the picture in the center of a print.

Wide-angle lens

A lens that has a wider field of view (includes more subject area) than a normal lens.

Zoom lens

The glass elements inside this lens move to change the focal length. In effect, this gives the photographer many lenses in one.

Loading Your Camera

Film is loaded into most 35 mm cameras about the same way. The film comes in a metal container to keep out the light. The metal container is put in one side of the camera (usually the left side). Film is wound over to the other side as you take pictures. Then, after you have taken all of the pictures on the roll, and before you open the camera, the film must be rewound back into the metal container.

Here's how to load film in a camera step-by-step.

Open the cardboard film carton.

Inside you will find a plastic can that protects the film from humidity. Remove the metal container of film. A piece of film sticks out of the metal container as though the film is sticking out its tongue.

Put the metal container into the camera so that the small spool sticking out of one end of the film container is pointing to the bottom of the camera. In most cameras, you have to pull up on the rewind knob before the film container will fit.

Then clamp the metal container into place. Since each camera does this a little differently, check your camera's instruction book or get your camera dealer to help you. Usually, pressing the rewind knob down will do it.

Now slip the tongue in the take-up spool found on the right-hand side of the camera. You will have to pull a little more film out of the metal container to do this. Be sure that the teeth on the take-up sprocket (near where you fastened the film) fit into the holes along both edges of the film. Wind up enough film so that the teeth are sticking through the holes on both edges of the film. Don't be afraid that you are spoiling good film in loading the camera. The processing lab will cut off about six inches of the film tongue whether it is exposed or not.

Once the film is attached and properly wound, *close the camera back.*

Press the shutter and advance three times to get to the first frame. Here, again, check your instruction book to be sure you do everything right for your camera.

Now you are ready to go!

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