How to Use This Pamphlet

The secret to successfully earning a merit badge is for you to use both the pamphlet and the suggestions of your counselor.

Your counselor can be as important to you as a coach is to an athlete. Use all of the resources your counselor can make available to you. This may be the best chance you will have to learn about this particular subject. Make it count.

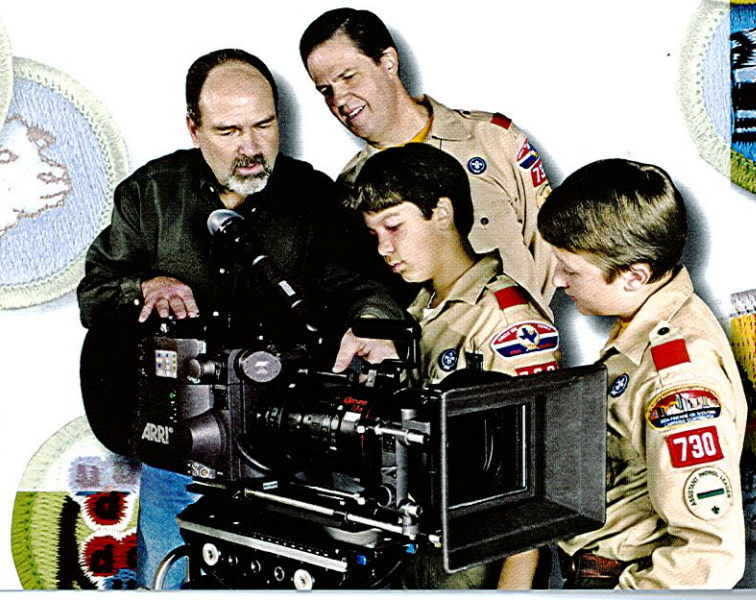
If you or your counselor feels that any information in this pamphlet is incorrect, please let us know. Please state your source of information.

Merit badge pamphlets are reprinted annually and requirements updated regularly. Your suggestions for improvement are welcome.

Send comments along with a brief statement about yourself to Youth Development, S209 • Boy Scouts of America • 1325 West Walnut Hill Lane • P.O. Box 152079 • Irving, TX 75015-2079.

Who Pays for This Pamphlet?

This merit badge pamphlet is one in a series of more than 100 covering all kinds of hobby and career subjects. It is made available for you to buy as a service of the national and local councils, Boy Scouts of America. The costs of the development, writing, and editing of the merit badge pamphlets are paid for by the Boy Scouts of America in order to bring you the best book at a reasonable price.



BOY SCOUTS OF AMERICA
MERIT BADGE SERIES

PHOTOGRAPHY

BOY SCOUTS OF AMERICA®

Requirements

1. Explain how the following elements and terms affect the quality of a picture:
   a. Light—natural light/ambient, flash
   b. Exposure—aperture (f-stops), shutter speed, depth of field
   c. Composition—rule of thirds, leading lines, framing, depth
   d. Angle of view
   e. Stopping action
2. Explain the basic parts and operation of a film camera or digital camera. Explain how an exposure is made when you take a picture.
3. Discuss with your counselor the differences between a film camera and a digital camera. List at least five advantages and five disadvantages of using a digital camera versus using a film camera.
4. Do ONE of the following:
   a. Produce a picture story using the photojournalistic technique of documenting an event. Share your plan with your counselor and get your counselor's input and approval before you proceed. Then, using either a film camera or a digital camera, produce your approved picture story. Process your images and select eight to 12 images that best tell your story. Arrange your images in order, then mount the prints on a poster board. If you are using digital images, you may create a slide show on your computer or produce printouts for your poster board. Share your picture story with your counselor.
   b. Choose a topic that interests you to photograph for an exhibit or display. Get your counselor's approval, then photograph (digital or film) your topic. Process your images. Choose 20 of your favorite images and mount them on poster board. Share your display with your counselor. If you are using digital images, you may create a slide show on your computer or produce printouts for your poster board.
5. Discuss with your counselor the career opportunities in photography. Pick one that interests you and explain how to prepare for such a career. Discuss with your counselor the education and training such a career would require.

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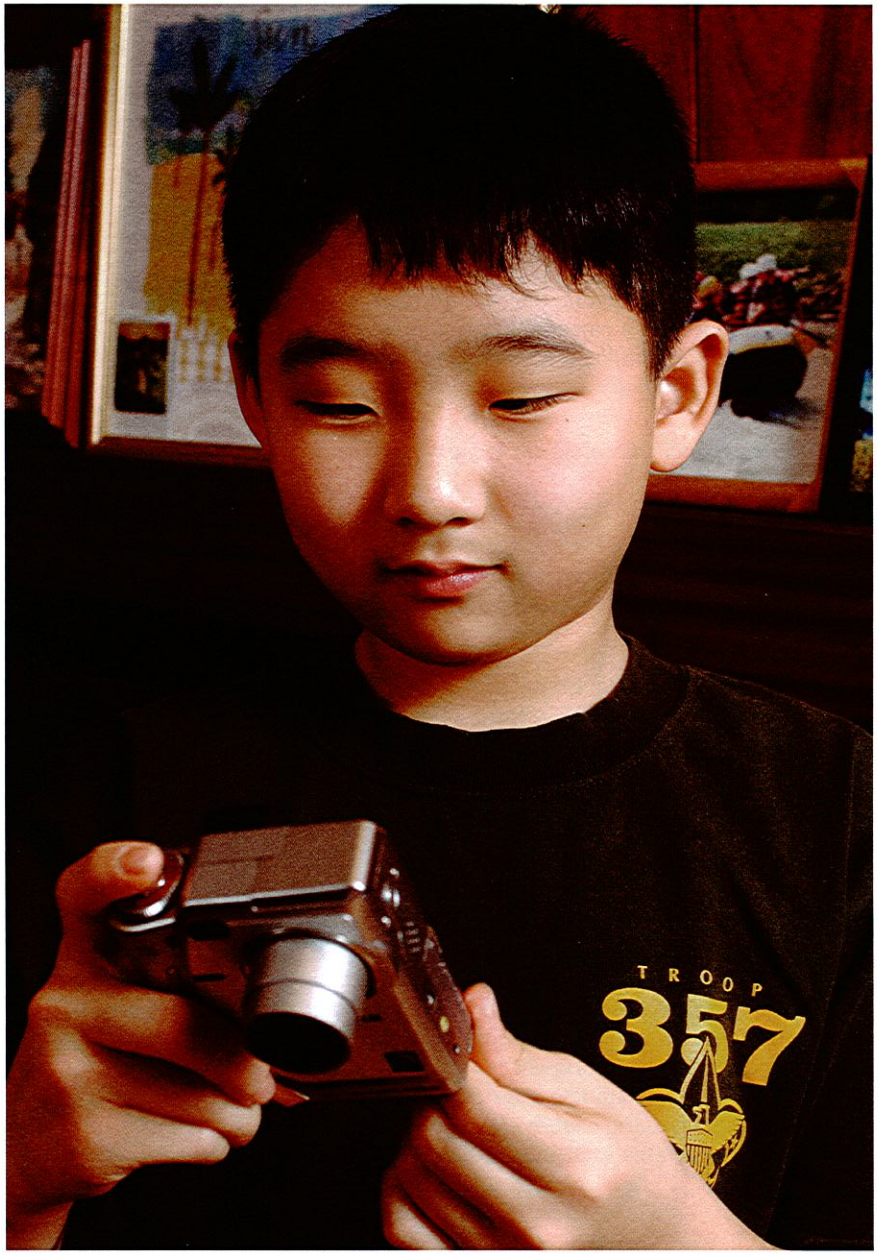

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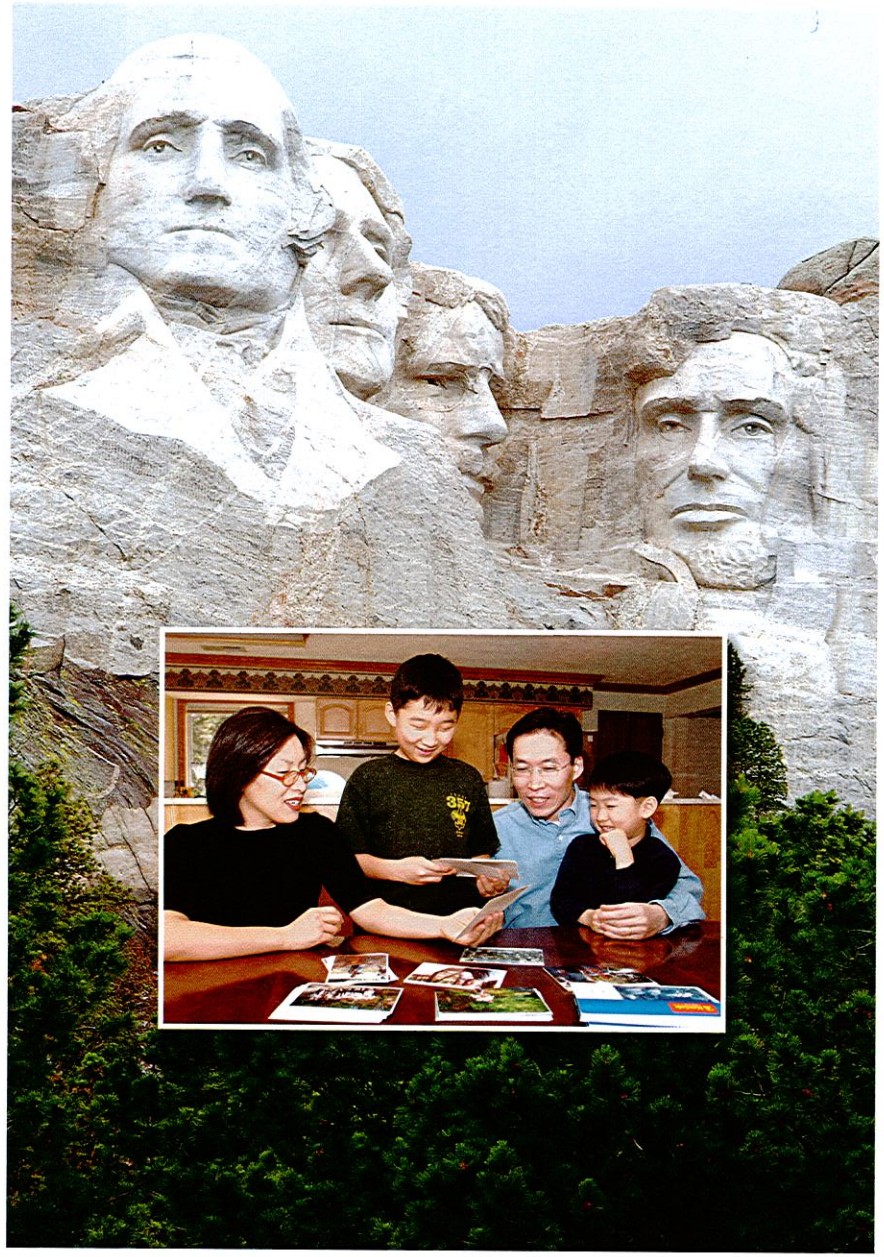


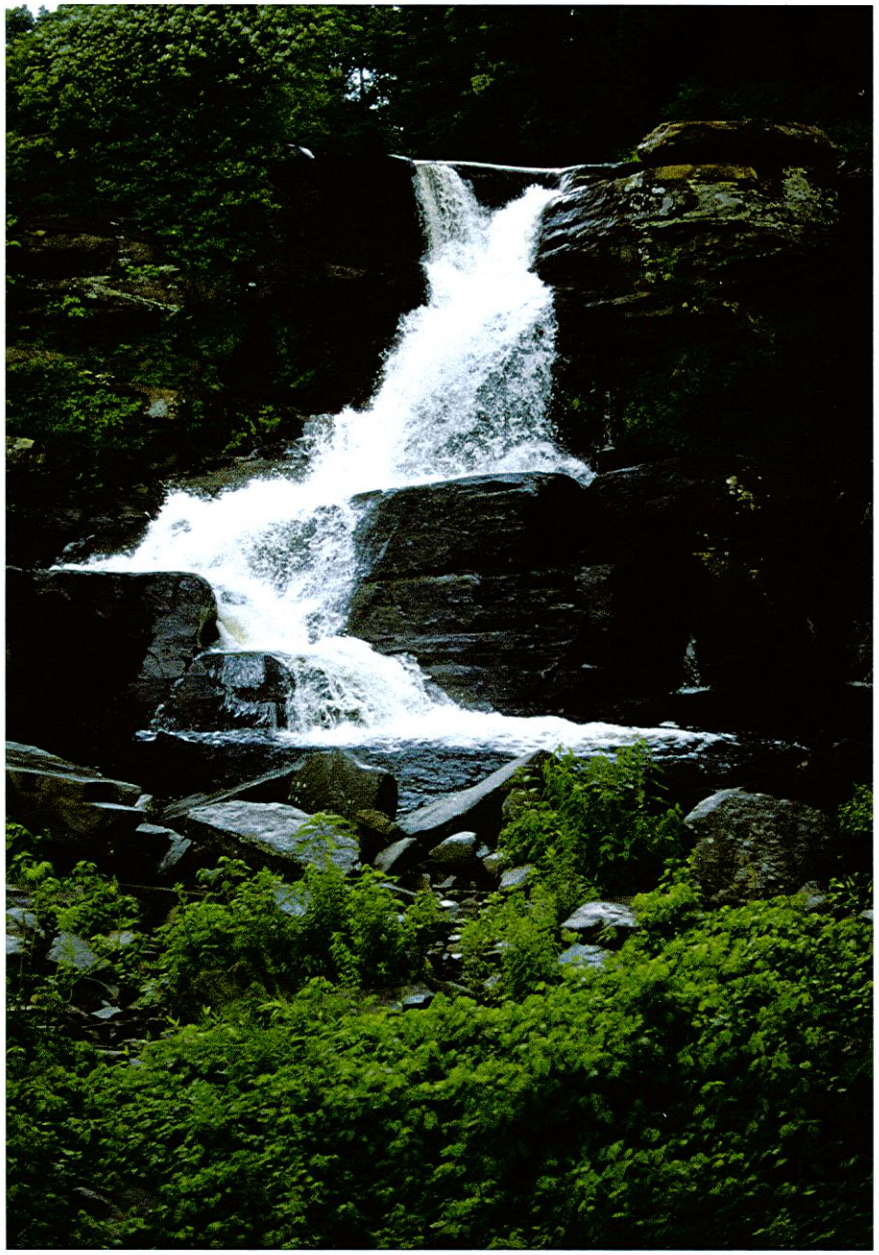
Introduction

Photography is a part of everybody's life. You look at photographs all the time. Your school textbooks, the local newspaper, the Internet, and your *Boy Scout Handbook* all have photos. You might see photos hanging on the walls around you at home, at school, or in a museum or gallery.

Your parents probably took photographs of you soon after you were born or on your first birthday. Photos provide lasting memories of family milestones, vacations, holidays, and other special events.

Beyond capturing family memories, photography offers a chance to be creative. Many photographers use photography to express their creativity, using lighting, *composition*, depth, color, and content to make their photographs into more than snapshots. Good photographs tell us about a person, a news event, a product, a place, a scientific breakthrough, an endangered animal, or a time in history. Imagine what the world would be like without photography.

Choosing subjects and taking photos can be satisfying. But seeing the *prints* in your hand or the images on a computer screen at the end of the process presents the real reward. This pamphlet will help lead you into the fun of photography. Using this information and fulfilling the requirements for the Photography merit badge will put you on your way to capturing the visual world.



Ingredients for Making Good Photographs

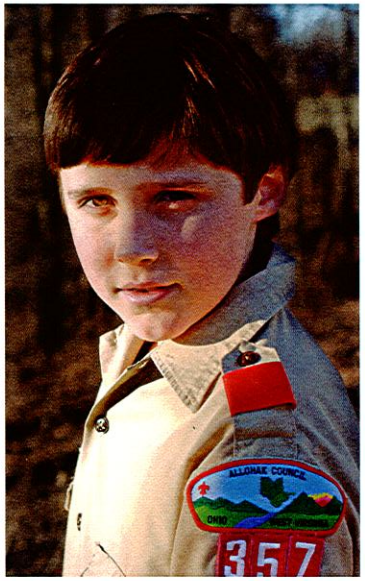
Photography combines technical ability and creativity. Follow the guidelines in this section to gain a good foundation for making interesting, properly exposed, and well-composed photographs.

Light

The human eye sees certain wavelengths of light. What people can see is known as the **visible spectrum** of light. Beyond this range are wavelengths our eyes can't see—infrared, ultraviolet, X-rays, and others. Normal *film* and digital cameras are made to capture the same visible spectrum of light that we see. Special films can record some of the other wavelengths of light, such as infrared.

Commonly, photographers work with just two types of light: natural and artificial. Natural light, provided by the sun, is available during daylight hours outdoors, and indoors as it passes through windows illuminating a room and its contents. All other light—including streetlights, household lamps, car headlights, or the *flash* on your camera—is considered artificial light.

Natural light can give off certain casts of color. Early morning and late afternoon sunlight produces *warmer,* more amber colors. The low direction of this light and its



If the quality of light is missing, then the quality of your photos also will be reduced.

Artificial light can help add mood or softness to photographs.

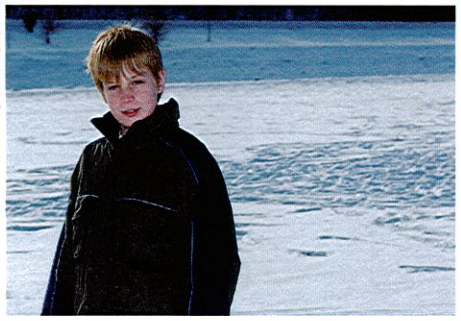
warmness make it the preferred light among photographers. The shadows are longer and the light softer at this time of day. During the middle of the day, the sun produces harsh shadows and *cooler,* bluish colors.

Incandescent light such as from a table lamp produces a warm cast, creating a mood similar to a campfire's glow. Fluorescent light inside an office building casts a greenish light. Your eyes correct for this color, but film does not. You can use this light to enhance your desired effect, or you can correct the color by using a flash or attaching a correcting *filter* to your *lens.*

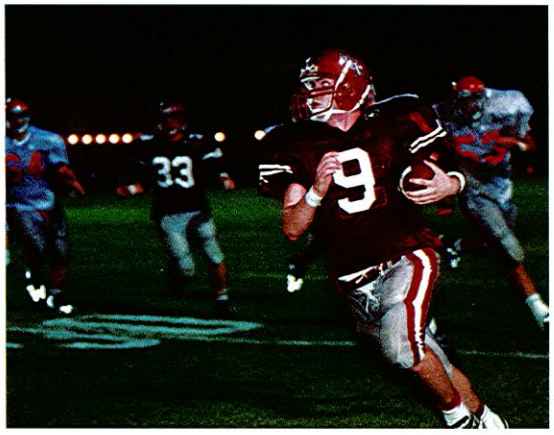
Try to avoid the harsh light and shadows of midday unless you can work in an open, shaded area.

Flash

A flash is an artificial light source that adds light to the *ambient (existing) light.* It can be a flash built into your camera or one on a stand with a reflective umbrella like you see in a portrait studio. Most modern flash units automatically adjust the output of light to properly expose your film. With an adjustable flash, you can control the amount of light on your subject.



If shooting outdoors with harsh shadows, you can use a flash to add *fill light* to shadowed areas within a certain distance.



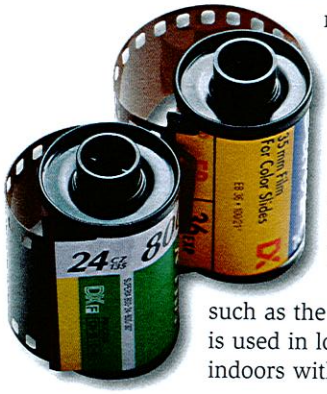
A flash lets you take photos at night or indoors where there is too little light to make a good *exposure.* Flash used well can help you stop the action and get shots you might not get otherwise.

Flash also is used to stop action. Used up close, the flash freezes movement for that split second. If you are too far away from a subject, your flash may be too weak to illuminate or stop action. Check the scale on your flash to know its range. The LCD display on most modern flashes will show the flash range based on the other camera settings. A camera with a built-in flash will illuminate a subject only 10 to 30 feet away. An automatic flash reads the light reflected off the subject to determine the range of flash. Be sure your flash is reading the light off the correct subject; if there is anything between the flash and the subject, the flash might read that reflecting light and inadequately light the real subject.

A common problem with flash is **red-eye**—flash reflects off the retina inside the subject's eye, causing the pupil to appear red in the photo. To correct the problem, move the flash farther off to the side instead of directly in front of the subject, and ask the subject not to look directly at the lens. Many new camera models, including digital cameras, feature a red-eye reduction mode, which works by triggering a pre-flash that causes the eye to react before the main flash fires.

Film

Understanding film's sensitivity to light will help you choose the best *film speed.* A film that is very sensitive to light is known as a **fast film.** The faster a film, the less light it needs to produce an image.



Common film types include black-and-white negative, color negative, and color *transparency (slide)* films.

A 100-speed (100 ISO) film is used in a bright-light situation such as a sunny day outdoors. This also is a good film for studio use where you control the amount of artificial light—usually flash.

A film speed of 400 ISO is used with less light, such as the light outdoors on a cloudy day. An 800 ISO film is used in lower-light settings such as at dusk, at dawn, or indoors without a flash.

The higher the film speed number, the more sensitive the film is to light. However, higher film speed reduces *sharpness* and quality. The film's grain is more obvious, producing grainy pictures. It is a good practice to use the slowest film speed possible for the best quality, even if you must use a tripod to hold the camera steady.

The ISO is a numerical rating that describes film's sensitivity to light. The ISO rating doubles as the sensitivity to light doubles. *ISO* stands for International Organization for Standardization.

Digital Cameras and Film Speed

Digital cameras do not use film, but they do recognize different film speeds. The memory card in a digital camera is based on the same sensitivity to light as film and also uses the ISO rating as its standard. With a digital camera, you can change your film speed at any time without changing your media card. If you go outdoors, you can use a slower film speed. Then you can go inside, pick a faster film speed, and keep shooting. With a film camera, you would have to change rolls of film to do this.

As with film at higher film speeds, digital also loses image quality the higher the speed. Instead of the film looking grainy, the digital image has *noise*—brightly colored or white spots in the image, similar to snow on a television set.

Exposure

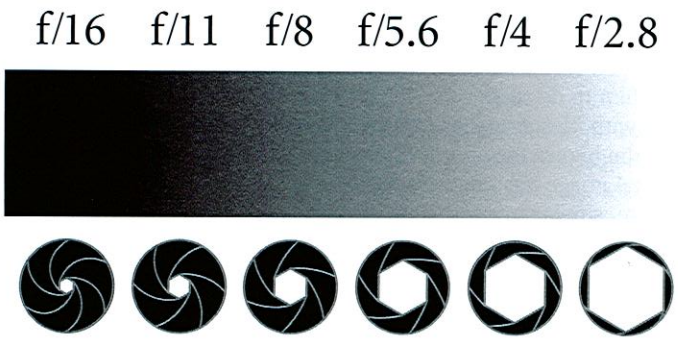
Shutter speed controls the length of time the *shutter* is open to let light into a camera. The *aperture* (size of the lens opening) controls the amount of light entering the camera. The combination of shutter speed and aperture exposing the film is known as *exposure.*

The key to proper exposure is accurately measuring the lighting. Most *single-lens reflex (SLR)* cameras have built-in *light meters* that measure the light reflecting off the subject. A camera with manual mode allows you to choose both the aperture and the shutter speed as you take a light reading.

Most professional photographers and serious amateurs prefer using manual control to automatic. With manual exposure controls, you can determine the shutter speed needed to stop movement or the aperture required to get only the *foreground* in *focus* and not the *background.*

With a fully *automatic camera,* you have no control in the selection of the shutter speed and aperture settings. In automatic point-and-shoot cameras, your shutter speed and aperture are selected for you and usually make for good exposure.

Some cameras let you pick one part of the *exposure setting* while the camera handles the other part automatically. **Aperture priority** lets you select the aperture while the camera selects the shutter speed. **Shutter priority** lets you select the shutter speed as the camera selects the aperture. Most consumer-priced digital cameras are fully automatic, whereas professional models allow full manual control.



Aperture openings and f-stops

F-stop

As mentioned above, the aperture determines the amount of light that enters the camera. By turning the **aperture ring,** you select the f-stops. Each f-stop indicates the size of the opening in the lens.

F-stop numbers start at 1.4, 2, or 2.8 and go up to 16, 22, or 32. They are written with the letter f, a slash, and the number: f/2.8 or f/11, for instance. These numbers are fractions, so think of them as $^1/_{1.4}$, $^1/_2$, $^1/_{16}$, or $^1/_{22}$. Because these numbers indicate the size of the opening, you can see that $^1/_2$ lets in much more light than $^1/_{22}$ would.

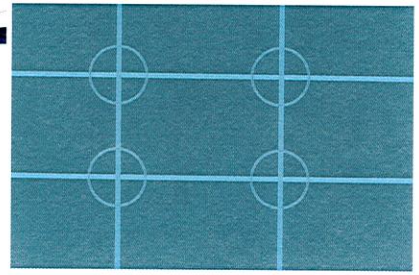
The smaller the f-stop—f/22, for example—the greater the area that will be in focus from foreground to background. This is called *depth of field.* A larger f-stop—f/2, for instance—creates less depth of field. That is, the part of the image in sharp focus will be smaller.

Focusing your lens, whether by manual or *automatic focus,* is a critical part of the quality of the image. To ensure sharpness, check that your focus is on the subject itself and not the foreground or background. As you compose your image, remember to place the subject to one side or the other, not in the center.

Composition

Photographic composition is much like other visual art. Good composition involves such elements as framing, *contrast,* texture, leading lines, balance, and the rule of thirds.

Here are a few guidelines for good composition.



Rule of thirds

Rule of Thirds

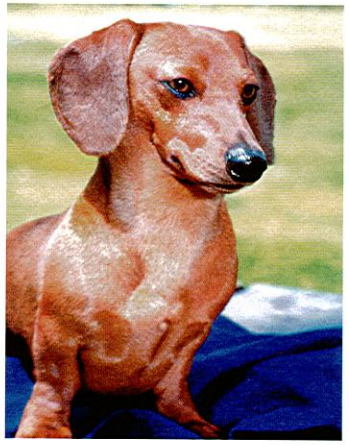
As you compose your subject in the *viewfinder,* think about its placement. Placing your subject off-centered both vertically and horizontally is a starting point.

Use the rule of thirds to help understand this concept. On a blank, rectangular sheet of paper, draw two lines dividing the paper into three equal parts top to bottom, then two more lines dividing it into three equal parts side to side. You should have nine small sections with four intersecting lines. Imagine these lines in your viewfinder when taking pictures. Place your subject at or near one of the four spots where the lines intersect to help avoid a centered, bull's-eye effect.

Framing

Framing means almost surrounding your subject with some nearby foreground element, such as overhanging tree branches. This technique draws attention to the center of interest in the image. The contrast between the near objects and the distant subject also can help show distance. Framing can be helpful for disguising a dull, boring sky or hiding unwanted scene elements.

Framing



Contrast

Contrast

Contrast adds interest by emphasizing the differences in the elements making up an image. Differences in tone, color, texture, size, or shape, for instance, can create appealing contrasts in a photograph. In the example shown here, the tan, fuzzy dog contrasts pleasantly with the bright blue blanket and green grass.

Leading Lines

Leading lines, straight or curved, lead the viewer's eye into the picture and draw attention to the subject. You can find a line in almost anything—a road, fence, bridge, stream, or hedge, for example. Even a line of people waiting to buy movie tickets can be used effectively.

Leading lines

Balance

Balance refers to the weight or significance of objects in the picture and how they work with other portions of the image. **Symmetrical balance** divides the picture into even halves. A photograph with **asymmetrical balance** has two very different halves.

Asymmetrical balance

Backgrounds

Backgrounds can add to or detract from photos. Even if the photographer does not notice something distracting, the camera will. Before you press the shutter release, look to see if there is a lamp or a pole growing out of your subject's head.

Avoid clutter. Use high or low *angles* to separate the subject from a busy background. You might need to add background information to a foreground subject to give your photos a feeling of depth.

Depth gives a three-dimensional feel to a two-dimensional subject.

Camera Angles

A normal camera angle, looking straight across at your subject from his own level, usually produces the most natural—although not the most dramatic—viewpoint. Animals and children usually look their best when photographed at their own level.

Some subjects, however, are better photographed from a low or high angle. You may avoid a cluttered or ugly background by looking up at your subject, shooting from a low angle to put trees or a blue sky in the background. Many scenic pictures will appear more vast if you look down at them from a high angle.

Varying the camera angle can give a different perspective to similar shots.

Angle of View

The angle of view is the amount of a scene that a lens can take in. The lens you use determines the angle of view. Some point-and-shoot cameras have a fixed focal length lens, giving you only one angle of view. This angle of view is much like what human eyes see in normal vision, roughly equivalent to a 50mm lens. Other cameras have zoom lenses, which give a varied focal length and varied angle of view.

Normal lens

Wide-angle lens

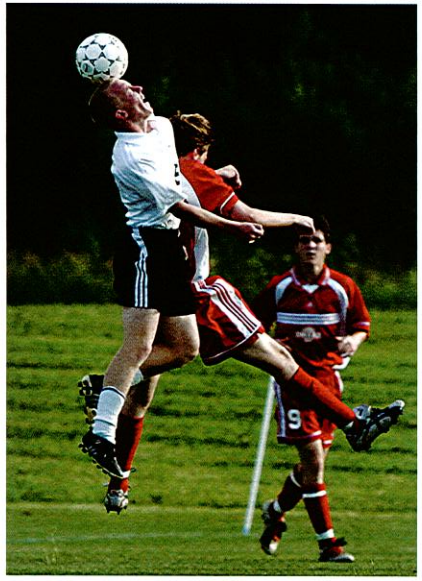
Telephoto lens

Generally, a wide-angle lens will give a larger angle of view, while a telephoto lens compresses the subject and gives a smaller angle of view. A wide-angle lens is a good choice when you are close to your subject. A telephoto lens is best for subjects you can't get close to.

Stopping Action

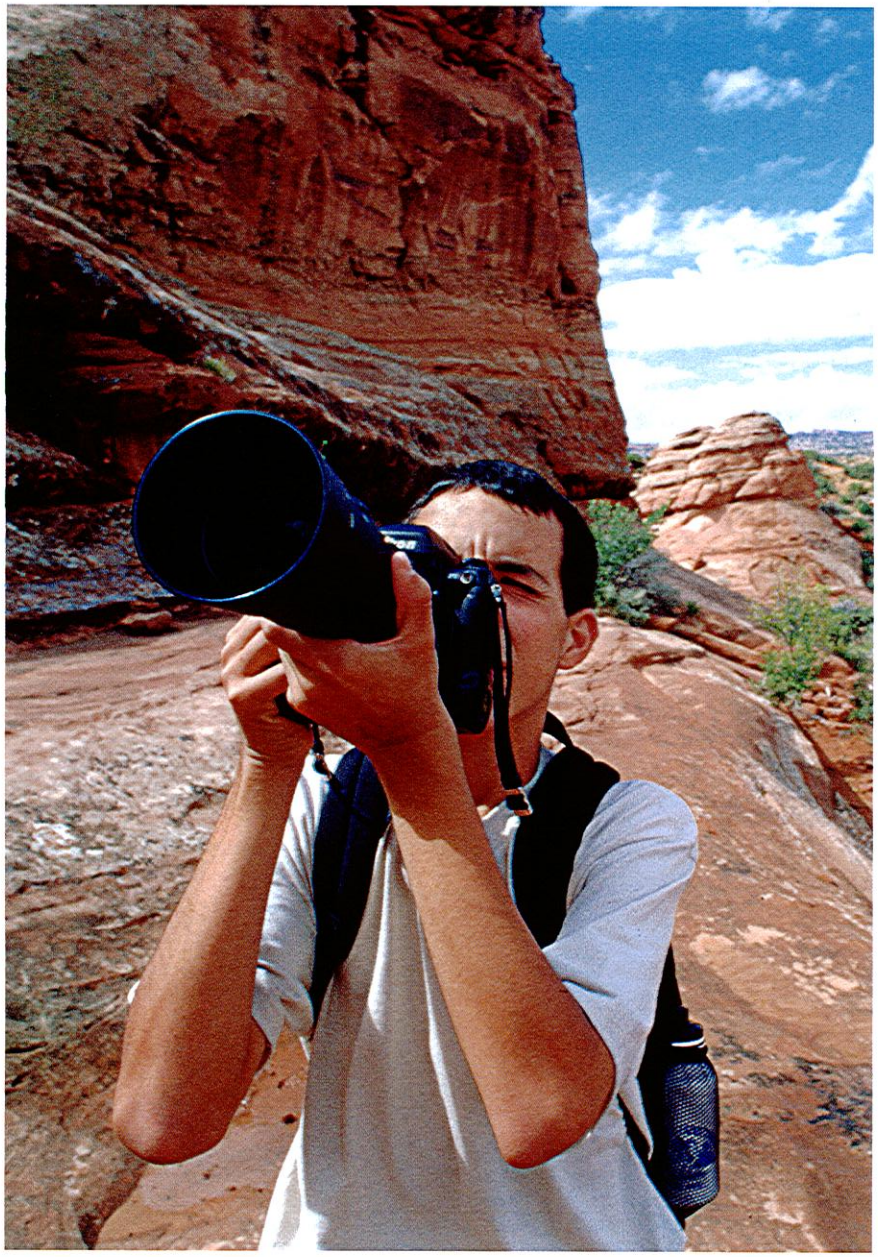
Earlier we discussed the importance of f-stops in controlling your depth of field and what is in focus. Now look at how the other part of the exposure equation—shutter speed—helps in stopping action.

Remember that shutter speed controls the length of time that light enters the camera through the lens and falls onto the film or the digital chip. Most shutter-speed settings of 1/60th of a second or faster are OK to hand-hold. In low-light situations, you might not be able to set your shutter speed at 1/60th or above. Anything below this will tend to show camera movement in your final results. To attempt taking photos below 1/60th of a second, keep your arms close to your body, take a deep breath, and slowly press the shutter-release button.



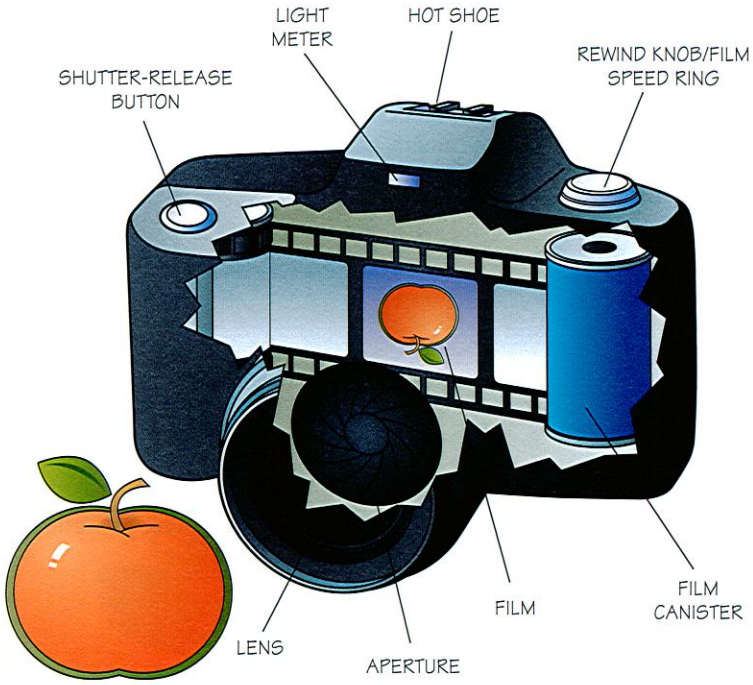
Whenever possible in a low-light, slow-shutter-speed situation, use a tripod. If you do not have a tripod, set your camera on something stationary like a tabletop, fence post, car hood, park bench, or other fixed object. This will help you get sharp photos using slow shutter speeds.

Shutter speeds at 1/125th or 1/250th of a second are best for normal situations. If you want to stop fast action such as at a track meet, a pinewood derby, or a downhill ski event, you will need 1/500th of a second or above. Note that in using these shutter speeds, you will need to be in a well-lit environment and use fast film of at least 400 ISO.



Cameras and How They Work

A camera is basically a light-tight box with a lens on the front and film inside. When you press the shutter-release button, the camera's mechanical and electronic systems kick in. The aperture closes down to the selected f-stop and the shutter opens, exposing the film or recording onto a digital chip. The shutter then closes, blocking the light again.



The camera lens controls the sharpness and the angle of view. During an exposure, light reflects off the subject, enters through the lens, and forms an image on light-sensitive film or on a digital chip. Once each exposure is gathered, the advance lever takes you to the next *frame* until all shots have been taken. Some all-manual cameras will function mechanically without batteries. All-electronic automated cameras must have battery power.

The actual work of taking pictures, up to this point, is the same with a film camera and a digital camera. Once you have captured the image into the camera, things start to look a little different. When light hits film, it exposes it. The film is developed through a chemical process, and the developed *negatives* are used to make prints. Those same negatives can be scanned onto a compact disc and used on your computer.

In a digital camera, the information is stored on a *charge-coupled device.* The CCD is made up of millions of light sensors. The number of *pixels* (image elements) the digital camera produces determines the final quality of the image. A digital camera with 5 megapixels will produce a higher-*resolution* image than will a 2.1-megapixels camera. The digital files are then transferred to a computer for viewing or output to a printer. These digital files can be stored on the computer or burned to a CD or a DVD for archiving.

Camera Care

Whether you use an inexpensive point-and-shoot camera or a pricier SLR model, you will need to care for it. Here are some tips.

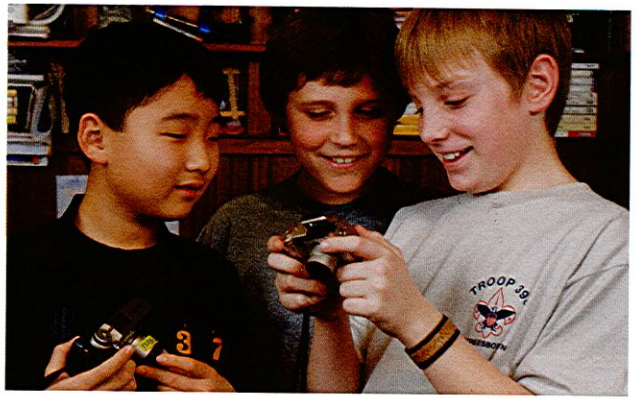
- Keep your camera dry.
- Clean your camera after use.
- Use a camera case or bag to keep and carry your camera in between uses.
- Do not leave your camera in your car for long periods.
- Avoid dropping your camera.
- When storing your camera for long periods, remove the batteries.
- Use a UV/skylight filter on the front of your lens to protect the front element of your lens from collecting dust and help reduce ultraviolet rays.
- Use a camera strap when carrying your camera.
- Always secure your camera—do not leave it unattended.

Film vs. Digital: A Place for Both

Film is familiar to photographers. You load your camera, take your shots, then drop off the film to have prints made. Your negatives are available for additional prints to be made at any time. From properly exposed negatives, good quality *enlargements* can be made, prints measuring 8 by 10 inches or even larger. Your neighborhood photo finisher can process your film in a day, maybe an hour. After you are done with this set, you pack them away in a box somewhere, hopefully to be found if you want to look at them again later. If you take lots of photos, you will need adequate space to store the prints and negatives.

Film makes it easy to send your grandparents or faraway friends **prints,** or hard copies, of your school play, winning soccer game, or troop court of honor. Many of these prints end up on the refrigerator door or in a family scrapbook.

People have been slow to change from film cameras to digital cameras. Digital photography is becoming more popular, however, as the quality improves and the prices of digital cameras level off. Some people who buy a digital camera keep a film camera for certain uses.



One major advantage of a digital camera is that it lets you see what your shots look like right away. If something is not

right, you can make an adjustment, retake the shot, and delete the unwanted version. And because the files are digital, you can easily send pictures in an e-mail.

Changing film speeds in a film camera requires changing rolls of film. With a digital camera, you can change the film-speed settings on the camera and continue to shoot the next frame.

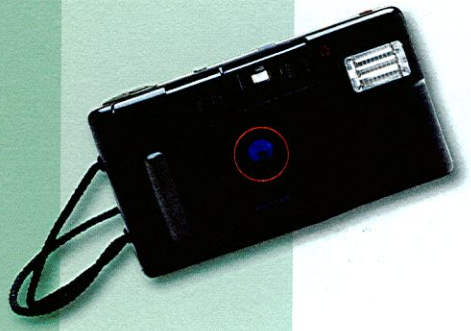
Film vs. Digital—the Pros and Cons

Film Pros

- Familiarity of use
- Quality enlargements possible
- Less expensive camera
- Convenient one-hour photo finishing
- No computer hardware or software needed

Film Cons

- Results unknown until prints are ready
- All shots printed, whether bad or good
- Storage needed for prints and negatives
- Organizing and finding particular negatives
- Costs of film, processing, and prints
- Only 24 to 36 exposures per roll



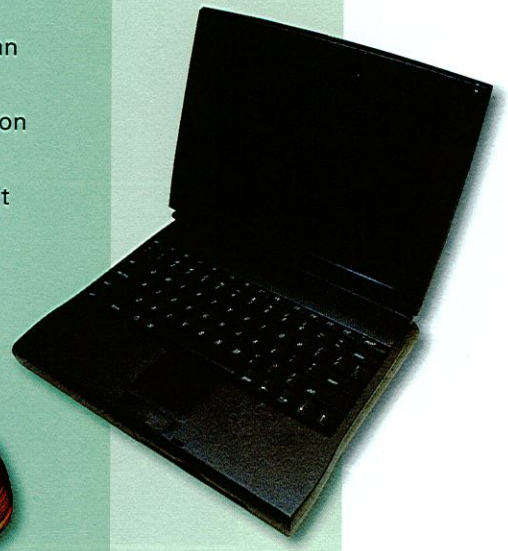
Film vs. Digital—the Pros and Cons

Digital Pros

- Results immediately available
- Photos can be viewed and *edited* on home computer
- Long-term savings
- Control what you keep or delete
- Print only the shots you want or need
- Memory cards can hold many shots

Digital Cons

- Computer and printer required for printing
- Camera cost higher than film equivalent
- Storage space needed on computer or CDs
- Time-consuming to edit and print
- Large prints require high resolution



Telling a Story With Your Pictures

A picture story is much like a written story; it has a beginning, a middle, and an end. The main difference is you tell the story using pictures rather than words. The best way to accurately tell a picture story is by using a photojournalistic approach, documenting an event rather than posing it—setting it up especially for photography.

Many events go on in your community or during Scouting activities. These present good visual opportunities to document. You might choose to photograph a parade, a fair, a town meeting, a dedication, a competition, or any activity involving several people. Scouting has activities such as camporees, summer camp, Scouting shows, campfire programs, and courts of honor. Find something you feel comfortable with and ask the event's organizer for permission to photograph it for your merit badge project.

When photographing an event, look for pictures that will introduce your story. Maybe you'll take an overview shot that gives a sense of place, or a shot that shows where you are and how many people are attending the event.

Then get shots of people interacting during the event. Think about what part of the event is most important and include that special moment or peak action.

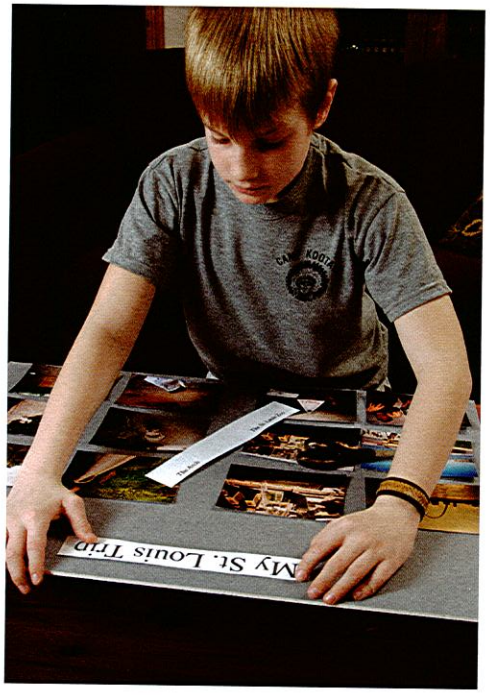
In documenting an event, be thorough. Take multiple shots for each part of your picture story.

Lastly, look for the closing picture. It could be an obvious shot of the actual ending of the event, or something else that brings the story to a close.

After you have taken the shots and prints are made or downloaded to your computer, look for the ones that best tell the story. Arrange them in order of beginning, middle, and end to give the story a natural flow.

The Presentation

If you are working with film, mount your final prints on a poster board. Under each print in the presentation, attach a typed **cutline** telling the who, what, when, where, and why of each situation. Cutlines complement the photos by giving the viewer additional information.



Remember to give your story a title.

If you are working with digital files, you can create your picture-story presentation by printing your digital files on your printer at home and then following the method for film prints as described above. An alternate method is to produce a digital slide show to present on a computer screen. Most slide-show programs have text capabilities that will allow you to type cutlines below or beside each photo in your presentation.

If you produce a slide show, make sure you have a way to present it to your merit badge counselor. Find out what computer system your counselor uses and be sure your presentation will run on it. Before presenting your slide show to your counselor, test it on a computer other than your own, such as those at your school or public library.

Storyboarding

Illustrating a Topic or Theme With Pictures

Illustrating an idea is different from covering an activity as it happens. When you document an event or activity, you do not set it up beforehand. For this next project, however, you control the situation to fit the topic or theme you have chosen.

First, come up with an idea. Talking over ideas, brainstorming with friends or family members, can help you think of a topic for your project.

Once you have an idea, use a technique called **storyboarding**—writing down on index cards the various photos you want to use in your project. Each card represents one picture, one shot, or one scene and can include a rough sketch of the shot and any pertinent information, such as location, camera angle, or the message the shot should convey.

Decide how the presentation will start, and how it will flow from the beginning through the middle to the end. Think about your setting and what props you might need. Decide what the subjects are to be doing in each shot. Once you have your topic all planned out and storyboarded, then set up the shots one at a time as described on your storyboard cards. Once the shot is set up, start photographing.

When you have a set of images illustrating your topic as planned, mount and display them on poster board or prepare them for a digital presentation. Remember to give your presentation a descriptive title.

A Career in Photography

Whether you are photographing a presidential election or a class of kindergartners, photography can be fun and profitable. There are many careers in photography. Several careers are listed in this chapter, and there are many others. Many specialized fields have photographers who work only in that particular area, such as scientific, technical, educational, or research work.

The most common photography careers include commercial studio, portrait studio, photojournalism, and specialized photography such as medical or underwater. Some careers keep you indoors in one location, while others can take you around the globe.

A digital photojournalist with a laptop computer, for example, can receive a photo assignment in an e-mail, go to a location, take pictures with a digital camera, edit the choices, caption each photo, then transmit the results to the office from any location using a wireless connection or telephone. Such

work could keep a photographer in the field more days of the year than he or she is working in an office.

From the careers listed here, choose a particular field of photography that interests you and research it. Talk with your counselor about what you have learned.

Career Opportunities in Photography

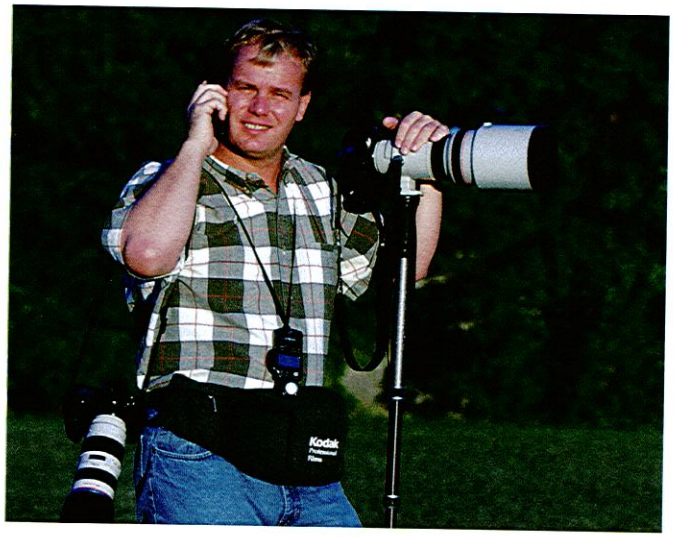
Advertising	Military
Aerial	Multimedia
Agricultural	Nature
Archaeological	Oceanographic
Architectural	Photo editor
Commercial	Photojournalist
Documentary	Portrait
Educational	Real estate
Entertainment	Scientific
Fashion	Sports
Fine art	Stock
Fire	Studio
Forensic	Travel
Industrial	Underwater
Magazine	Wedding
Medical	Wildlife

Preparing for a Career in Photography

Learn by doing. Look for ways to get experience as a photographer. Join a camera club. Take pictures for your school newspaper or club newsletters or Web sites. Get a summer or part-time job with a local newspaper, photo studio, or camera store. Assist and learn from an experienced photographer. Cultivate a good eye for composition and your artistic sense. Submit your best work to magazines.

Learn to use computers and specialized software to edit digital images. Take art classes to learn about design and composition. Depending on your career goals, you also might need to know about business, advertising, journalism, printing, publishing, physics, chemistry, or electronics.

Many universities, community colleges, and vocational-technical schools offer photography courses. As a photography student, you will learn about equipment, processes, and techniques.



Getting a job in photojournalism or industrial or scientific photography generally requires a college degree in journalism or photography. Photographers working in any field must have good technical skills, whether they gain their skills through experience, a degree program, or vo-tech training.

Glossary

ambient light. Existing light.

aperture. Lens opening; the opening in a lens system through which light passes. The size of the aperture is either fixed or adjustable. Lens openings usually are indicated by f-numbers.

automatic camera. A camera with a built-in exposure meter that automatically adjusts the lens opening, shutter speed, or both for proper exposure.

automatic focus. A system by which the camera adjusts its lens to focus on a given area; for example, whatever is at the center of the image.

background. The part of the scene that appears behind the main subject of the picture.

camera angles. Various positions of the camera (high, medium, or low; and left, right, or straight on) with respect to the subject, each giving a different viewpoint or effect.

charge-coupled device (CCD). A light-sensitive device in digital cameras.

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

contrast. The difference in darkness or density between one tone and another. Also, using different forms, textures, colors, etc., in a composition to emphasize their differences for artistic effect.

cool. Bluish colors that, by association with common objects (water, ice, etc.), give an impression of coolness.

depth of field. The distance range between the nearest and farthest objects that appear in acceptably sharp focus in a photograph. Depth of field depends on the lens opening, the focal length of the lens, and the distance from the lens to the subject.

editing. The process of selecting, arranging, and preparing images and image sequences.

enlargement. A print that is larger than the negative or slide; blowup.

existing light (available light). Strictly speaking, existing light is all natural lighting from moonlight to sunshine. By definition for photographic purposes, existing light is the light that is already on the scene or project and includes room lamps, fluorescent lamps, spotlights, neon signs, candles, daylight through windows, outdoor scenes at twilight or in moonlight,

and scenes artificially illuminated after dark.

exposure. The quantity of light allowed to act on a photographic material; a product of the intensity (controlled by the lens opening) and the duration (controlled by the shutter speed or enlarging time) of light striking the film or paper.

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

fill light. A source of illumination that lightens shadows cast by the main light and thereby reduces the contrast in a photograph.

film. The material used in a film camera to record a photographic image. Generally it is a light-sensitive emulsion coated on a flexible acetate or plastic base.

film speed. The sensitivity of a given film to light, indicated by a number (such as 200 ISO). The higher the number the more sensitive, or the faster, the film. ISO stands for International Organization for Standardization. ASA stands for American Standards Association, the former name of the American National Standards Institute Inc. (ANSI), which provides the standards for rating film.

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.

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

focus. The position at which rays of light from a lens meet to form a sharp image.

foreground. The part of the scene that appears in front of the main subject of the picture.

frame. A single image in a roll of film.

f-stop. A number used to indicate the size and light-passing ability of the lens opening on most 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.

hot shoe. A bracket on the top of the camera that attaches a flash unit and provides an electrical connection to synchronize the camera shutter with the firing of the flash.

ISO. A numerical rating that describes the sensitivity to light of film or of a digital camera's CCD. The ISO rating doubles as the sensitivity to light doubles. See *film speed.*

lens. A piece or several pieces of optical glass shaped to focus an image of a subject.

light meter. An instrument that measures the light reflected from or falling on a subject; used as an aid to selecting the exposure setting.

negative. The developed film with tones that are the reverse of those in the original image.

normal lens. A lens that makes the image in a photograph appear similar to what the human eye sees. A normal lens has a wider field of view than a telephoto lens and a narrower field of view than a wide-angle lens.

pixel. Short for picture element. Images are composed of many individual pixels, each having a specific color or tone that can be displayed, changed, or stored. When the pixels are small enough, the eye merges the individual pixels into continuous tones.

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

resolution. The fineness of detail in a digital image, often expressed as the number of pixels per inch (ppi) in a displayed image or the number of dots per inch (dpi) in a printed digital image.

sharp. Showing crisp, precise texture and detail; the opposite of blurred or soft.

shutter. Blades, curtain, plate, or other movable cover in a camera that controls the time during which light reaches the film.

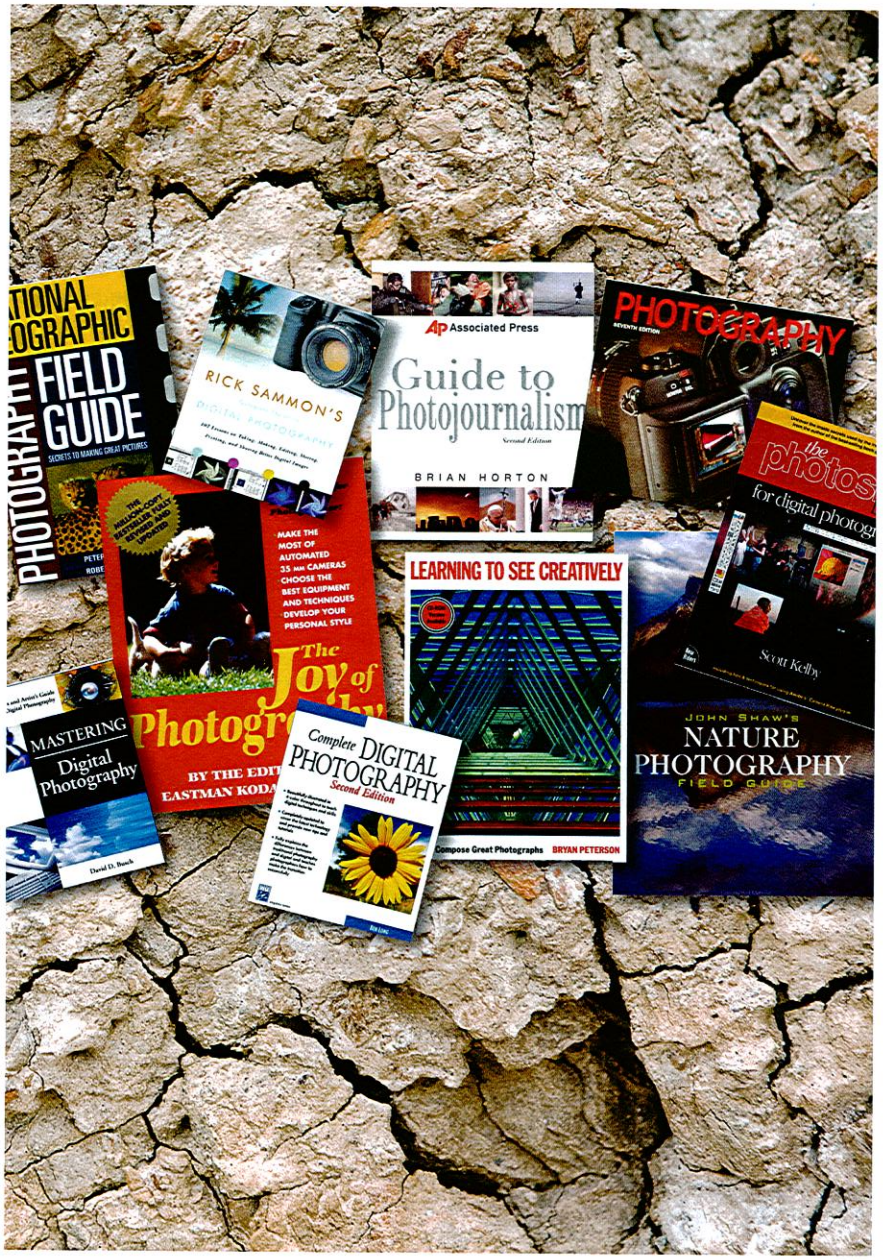
single-lens reflex (SLR) camera. A camera in which the scene to be photographed is viewed through the same lens that takes the picture. A mirror reflects the scene onto a glass where it can be focused and composed.

slide. A photographic transparency, usually color, mounted for projection.

transparency. A positive photographic image on film viewed or projected by transmitted light (light shining through the film).

viewfinder. A viewing device on a camera designed to show the subject area that will be recorded on the film. Also known as finder and projected frame.

warm. Reddish colors that, by association with common objects (fire, sun, etc.), give an impression of warmth.



Photography Resources

Scouting Literature

Digital Photo Magic; Art, Cinematography, Computers, Graphic Arts, and *Journalism* merit badge pamphlets

Visit the Boy Scouts of America's official retail Web site at *http://www.scoutstuff.org* for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

Books

Burian, Peter K., and Robert Caputo. *Photography Field Guide: Secrets to Making Great Pictures,* 2nd ed. National Geographic, 2003.

Busch, David D. *Mastering Digital Photography*. Muska & Lipman, 2003.

Davies, Paul Harcourt. *The Complete Guide to Close-Up & Macro Photography*. David & Charles, 2002.

Eastman Kodak Company, editors. *The Joy of Photography*. Perseus Publishing, 1991.

Frost, Lee. *Teach Yourself Photography,* 2nd ed. McGraw-Hill, 2004.

Grimm, Tom, and Michele Grimm. *The Basic Book of Photography: 2004 Edition*. Plume, 2003.

Horton, Brian. *Associated Press Guide to Photojournalism,* 2nd ed. McGraw-Hill, 2001.

Johnson, Bervin M., et al. *Opportunities in Photography Careers*. McGraw-Hill/Contemporary Books, 1998.

Kelby, Scott. *The Photoshop Book for Digital Photographers*. New Riders, 2003.

London, Barbara, John Upton, et al. *Photography,* 7th ed. Prentice Hall, 2001.

Long, Ben. *Complete Digital Photography,* 2nd ed. Charles River Media, 2002.

Norton, Boyd. *The Art of Outdoor Photography: Techniques for the Advanced Amateur and Professional*. Voyageur Press, 2002.

Sammon, Rick. *Rick Sammon's Complete Guide to Digital Photography: 107 Lessons on Taking, Making, Editing, Storing, Printing, and Sharing Better Digital Images*. W. W. Norton, 2003.

Shaw, John. *John Shaw's Nature Photography Field Guide*. Watson-Guptill, 2000.

Magazines

News Photographer
National Press
Photographers Association
3200 Croasdaile Drive, Suite 306
Durham, NC 27705
Telephone: 919-383-7246
Web site: *http://www.nppa.org/news_and_events/magazine*

Photo Techniques
6600 West Touhy Ave.
Niles, IL 60714
Telephone: 847-647-2900
Web site: *http://www.phototechmag.com*

Popular Photography & Imaging
1633 Broadway
New York, NY 10019
Telephone: 212-767-6000
Web site: *http://www.popphoto.com*

Shutterbug
Primedia Inc.
1419 Chaffee Drive Suite 1
Titusville, FL 32780
Telephone: 321-269-3212
Web site: *http://www.shutterbug.com*

Organizations and Associations

American Society of Picture Professionals
117 S. Saint Asaph St.
Alexandria, VA 22314
Telephone: 703-299-0219
Web site: *http://www.aspp.com*

International Association of Panoramic Photographers
Church Street Station
P.O. Box 3371
New York, NY 10008-3371
Web site:
http://www.panoramicassociation.org

National Press Photographers Association
3200 Croasdaile Drive, Suite 306
Durham, NC 27705
Telephone: 919-383-7246
Web site: *http://www.nppa.org*

Photographic Society of America
3000 United Founders Blvd., Suite 103
Oklahoma City, OK 73112
Telephone: 405-843-1437
Web site: *http://www.psa-photo.org*

Professional Photographers of America
229 Peachtree St. NE, Suite 2200
Atlanta, GA 30303
Toll-free telephone: 800-786-6277
Web site: *http://www.ppa.com*

Student Photographic Society
229 Peachtree St. NE, Suite 2200
Atlanta, GA 30303
Toll-free telephone: 866-886-5325
Web site: *http://www.studentphoto.com*

White House News Photographers Association
7119 Ben Franklin Station
Washington, DC 20044-7119
Telephone: 202-785-5230
Web site: *http://www.whnpa.org*

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Randy Piland—cover *(camera in bag, film, memory cards, computer)*; pages 4, 6 *(foreground)*, 7, 9–13 *(all)*, 15 *(both)*, 18–21, *(all)*, 24–27 *(all)*, 28 *(top)*, 29 *(top)*, 30 *(all at foreground)*, 32–34 *(all)*, 37, 40, and 44 *(all at foreground)*

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