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Home Lighting

HANDBOOK

Room-by-room Ideas • Fixtures • Wiring Techniques



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HANDBOOK

By the Editors of Sunset Books
and Sunset Magazine



Bright brass torchères, also shown on page 25.

Lane Publishing Co.
Menlo Park, California

Lighting up your home

Whether you're planning your overall lighting needs, looking for effective solutions to specific lighting problems, or seeking information on basic electrical circuitry, this book will meet your needs.

The first section offers guidance in determining what kinds of light you'll need, how much to use, and where to put it. In the middle section, we present an exciting array of colorful photographs showing lighting applications for every room in your home—and for outdoors, too. Finally, we show you how to wire it all together. You'll find step-by-step instructions for changing and installing fixtures and adding outlets and switches.

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photos; and Fran Feldman for her careful edit of the manuscript. Additional thanks go to Maureen Williams Zimmerman, Sarah S. Norton, and Michael Scofield for their editorial contributions.

Many others generously shared their lighting ideas, expertise, and examples. We'd particularly like to acknowledge Naomi Miller, Luminae, Inc.; Peggy Kass, IES; Kathleen Foote, Sylvania Lighting; and Joe Marcelli, Marcelli Lighting, Inc.

Cover: Outdoor and indoor lighting harmonize to create this striking scene. A movable underwater fixture spotlights the fountain; additional spots and built-in wall lights play on streams and pathways. Custom-designed fixtures on each outdoor column can be dimmed to suit the mood. Inside, banks of dimmable downlights brighten the living area; compact, movable uplights accent the indoor garden. Architect: The Steinberg Group. Landscape architect: Eldon Beck Associates. Photograph by Stephen Marley. Design by Roger Flanagan.



Hanging lanterns (see also page 78) were designed for candles. Now they're lighting up the garden.

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Editor: David E. Clark

Managing Editor: Elizabeth L. Hogan

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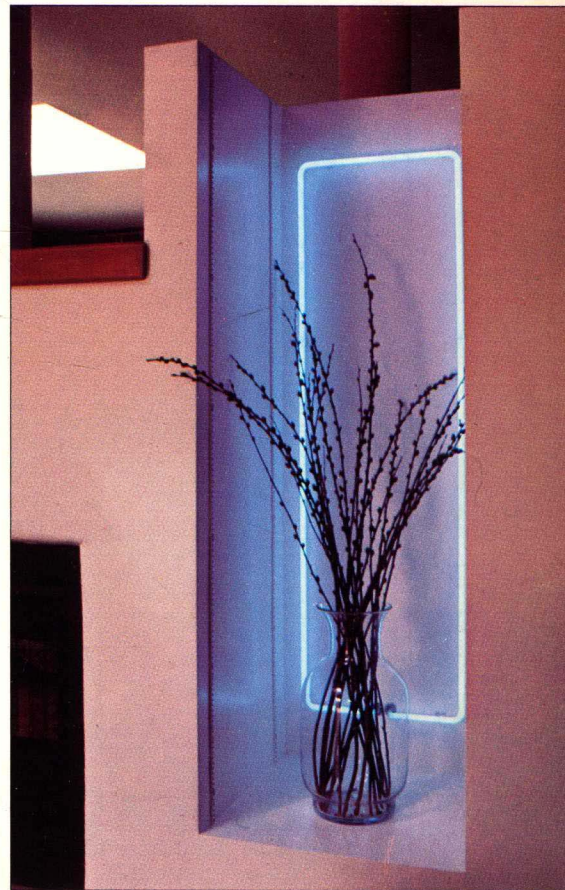
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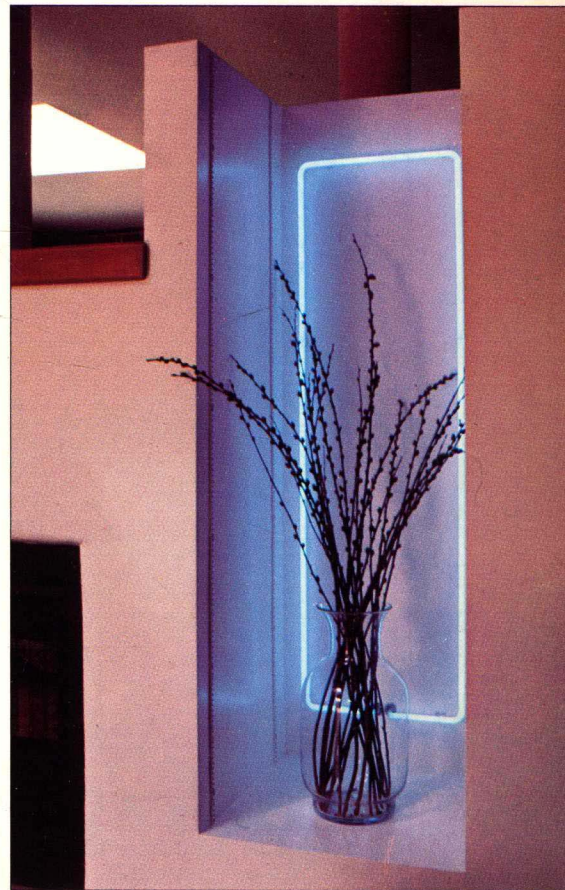
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Pendants steal the show

Italian pendant fixtures and recessed downlights combine to make this lighting scheme both eye-pleasing and functional. The hand-blown glass pendants are the focal point; their silvered bowl bulbs cast a warm, ambient glow over the breakfast table. The open downlights are unobtrusive but hard-working; note how their placement follows the lines of the center island and work counters exactly. Interior design: Ruth Soforenko Associates.

THE BASICS OF GOOD LIGHTING

P L A C E M E N T • B U L B S • F I X T U R E S

Good lighting design has an elusive quality; when you walk into an effectively lighted room, your eyes sense that everything is easily visible, but you'll rarely remark, "What fantastic lighting!"

That's because our eyes don't see the light itself, of course, but only see the objects on which it shines. Light serves as a silent partner in enhancing our surroundings.

Whether you feel that your home needs more light or you're planning lighting for a new house or addition, you'll find this book full of useful ideas. In this chapter you'll learn some of the elusive principles of good lighting design, how to determine the amount of light you need, and what light fixtures are available.

Once you have some ideas in mind, you may want to contact a lighting consultant, either for advice or for a complete plan, depending on your project and your budget. In many larger cities there are firms that specialize in lighting design (look in the Yellow Pages under "Lighting Consultants" or "Lighting Systems & Equipment"). Architects and interior designers may also list lighting as a specialty.

All three of these types of consultants usually belong to the Illuminating Engineering Society (IES).

Stores and electrical supply houses dealing in light fixtures may have in-house consultants, too.

When looking for help, keep in mind what kind of expertise you can expect from each type of professional. Lighting designers will calculate the light levels and beams needed in a given space, and then determine the fixtures and placement required. Architects often choose to highlight the special architectural features of a building while providing light for functional purposes. Interior designers, concentrating on total decor, will often choose fixtures for their decorative as well as functional value. If you're aware of these professional tendencies, as well as your own preferences, you can choose the type of professional with whom you'll work best. In any case, let your own style and needs be your guide.

ELEMENTS OF LIGHTING DESIGN

An essential ingredient in lighting design is simple common sense.

The best lighting designer is a problem-solver, determining where light is wanted and needed, and then putting it there with economy and flair. You can take the same approach using the following guidelines.

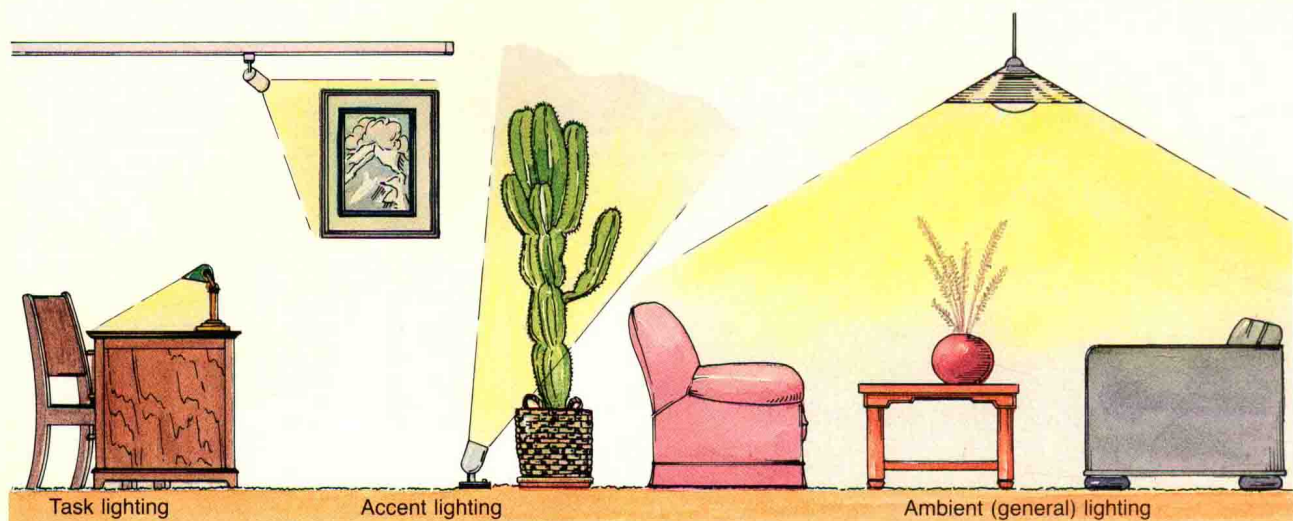
Three types of lighting

Today's designers separate lighting into three categories: task, accent, and ambient. Here's a quick definition of each type. (For an illustration of all three, see page 6.)

Task lighting illuminates a particular area where a visual activity—such as reading, sewing, or preparing food—takes place. It's often achieved with individual fixtures that direct light onto a work surface.

Accent lighting is similar to task lighting in that it consists largely of directional light. Primarily decorative, accent lighting is used to focus attention on artwork, to highlight architectural features, to set a mood, or to provide drama.

Ambient, or general, lighting fills in the undefined areas of a room with a soft level of light—say, enough to watch television by or to navigate safely through the room. Ambient lighting usually comes



from indirect fixtures that provide a diffuse spread of illumination. Directional fixtures can also be aimed at a wall to provide a wash of soft light.

Balancing & layering light

One rule of efficient lighting is to *put light where you want it*. But to ensure an attractive, comfortable lighting scheme, you also need to think about *balancing* light, that is, creating an effective spread of dim and strong light throughout the room.

The key to balancing is in layering light. Lighting designers first determine the focal point or points of the room (having two or three focal points is usually best). This is where they direct the brightest layer of light. Next, they add a middle layer to provide interest in specific areas without detracting from the focal points. The last layer fills in the background.

The first two layers are usually met with task or accent lighting, depending on what is being lit. The "fill" light is usually indirect. The ratio between the brightest light in the room and the fill light should be about 3 to 1, or at most 5 to 1. Ratios of 10 or even 100 to 1 are great for creating high drama, but they're too uncomfortable for everyday living.

Dimmers and control panels can help you custom-tailor light for multiple uses and decorative ef-

fects. Dimmers (also called rheostats) enable you to set a fixture or group of fixtures at any level from a soft glow to full-throttle. They're also energy savers. Control panels allow you to monitor up to nine or so functions from one spot. Originally designed for commercial use, they're now showing up in residential lighting schemes, too.

Beware of glare

One of the most important considerations in the placement of light fixtures is the glare they produce. Direct glare—a bare light bulb—is the worst kind. Deeply recessed fixtures or fixtures with black baffles or pinhole apertures (see page 15) will help remedy the problem. The interior surface finish of the reflector can also affect the amount of glare. Clip-on louvers and shutters, like those shown on page 14, help cut glare.

Watch for reflected glare, too—light bouncing off an object into your eyes. Light reflects off an object at the same angle it hits it. If the angle is too steep, the light produces a hot spot. The safety range is about 30° to 45°. (An example of a 30° angle is shown on page 9.)

If a fixture is located directly over a flat, shiny surface—for instance, a dining room table—veiling glare can be a problem. Objects on the table can deflect this glare; dimmers also help reduce the light level until it's comfortable.

Reflectance: The key to general light levels

How the color and texture of the walls, ceiling, and floor of a room contribute to the general light level depends on their reflectance—that is, the degree to which they reflect the light shed on them by windows and fixtures. The color and texture of the objects within a room also affect the overall light level.

Colors containing a lot of white reflect a larger amount of light, of course, and darker colors absorb light. A white object reflects 80 percent of the light that strikes it, while a black object reflects only 5 percent or less.

For this reason, if you were to redecorate your living room by covering creamy white walls with a rich blue wallpaper, you'd soon find that you needed more light sources and higher wattage bulbs to get the same light level as before. The illumination in a room with light-colored walls is distributed farther and more evenly as the light is reflected from surface to surface, until it gradually diminishes.

Texture plays a less important role in reflectance than color does. Matte finishes diffuse light; smooth, glossy finishes bounce light directly away, reflecting it onto other surfaces. Thus, a room with fabric-covered walls will require more or brighter light than a room with painted walls if it's to achieve the same level of light.

Color rendition

The color of an object as we perceive it is determined by two things: the surface color of the object and the color contained in the light shining on it. The color of a blue vase under a blue light will be heightened as the color of the light intensifies the color of the vase. Under a red light, the same blue vase will appear dull and grayish, because the red light waves are absorbed, and there are no blue waves to be reflected by the vase. This interaction between an object and a light source is called color rendition.

Light sources give off varying amounts of color. *Daylight*, or *sunlight*, appears white, but it actually contains the full spectrum of colors. *Incandescent light* includes colors from most of the spectrum but has a large proportion of yellow and red. When dimmed, incandescent light becomes even more red.

Fluorescent light is generally thought to be low in red and high in green and blue light waves, but, in fact, there are more than 200 "colors" of fluorescent tubes available. *Quartz halogen* produces brighter, "whiter" light than

either incandescent or fluorescent; it's popular for commercial display and museum lighting, as well as for residential use.

Light bulbs are formally rated by *color temperature*, measured in degrees Kelvin (K). Temperatures below 3,500°K are reddish or warm; higher temperatures are increasingly blue. The chart below, at left, shows the position of several standard light sources on the scale.

Because lighting can affect the apparent color of fabrics and wallpaper, it's always a good idea to choose furnishings and decorating materials under the same type of light you'll be using in your home. If possible, bring a swatch of material or a paint sample home. Or you can take it to a lighting store. Today's "light labs"—showrooms where you can directly compare light sources—make this process a lot easier.

How much light do you need?

Comfortable light levels are a matter of individual preference. Some people who work in brightly lighted offices grow accustomed to this kind of environment and want the same level of light in their homes. Other people feel more relaxed and secure in relatively low light levels, preferring to illuminate primarily the area in which they're reading, working, or relaxing.

For many years Americans have lived in relative brightness indoors—the light levels recommended by our lighting engineers have been much higher than those recommended in Europe. But with the new accent on energy conservation, our engineers are scaling down recommended levels. The trend now is toward providing bright lighting in task areas, with surroundings more softly lit, rather than trying to achieve uniform brightness.

Factors that affect light levels.

When you're determining how much light is needed for a given activity, weigh these factors: 1) the difficulty of the task to be performed, 2) the speed and accuracy with which it must be completed, 3) the color contrasts among the materials involved in the task, and

4) the eyesight of the person who will be engaged in the activity.

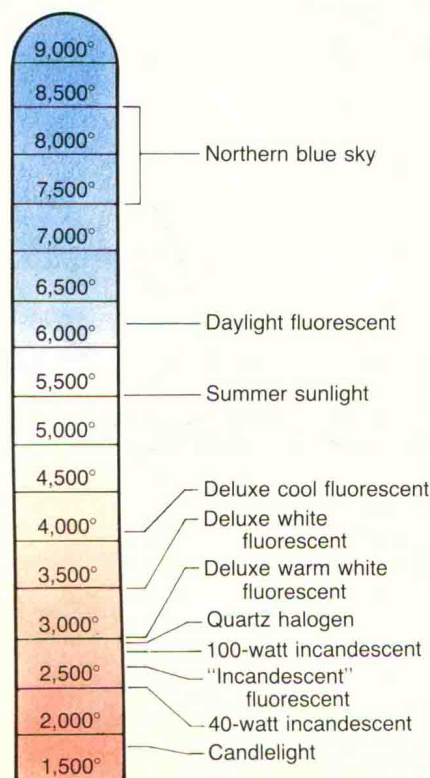
If an older person will be doing embroidery on a dark cloth with richly colored thread, for example, lots of light will probably be required; the task calls for a high degree of accuracy, and the weak contrast between the fabric and thread is hard on older eyes. For less demanding visual activities, such as reading the newspaper or watching television, light levels can be much lower.

Measuring lumens. One method for measuring and planning light levels involves adding up the amount of light, measured in *lumens*, emitted by all the bulbs in a certain area. If you look at the sleeve around a light bulb, you'll see that it states both the bulb's wattage (the amount of electricity used by the bulb) and the number of lumens, or amount of light, that the bulb produces.

As a rule of thumb, the most difficult visual tasks, such as embroidery, require a total of at least 2,500 lumens in an average room, with the greatest number of lumens concentrated at the work location. A casual task, such as watching television, requires from 1,500 to 2,000 lumens. To find the number of lumens available in a given room, area, or lighting plan, add up the lumen outputs of all the bulbs in that area.

For close, precise work, you might want a table lamp with a three-way bulb switched to high, providing 2,250 lumens, immediately next to the work area, while another nearby lamp with a 60-watt bulb adds another 850 lumens. Roughly the same total of lumens could also be supplied by two 100-watt bulbs or four 60-watt bulbs, arrayed around the work area, but common sense calls for a greater concentration of light at the work area.

General light levels. Though providing enough light for task areas is of primary importance, remember to light the surrounding areas with accent and/or ambient light. If these areas were not at least softly lighted, whenever you looked up your eyes would have to compensate for the change between light levels, resulting in eyestrain.



DETERMINING YOUR LIGHTING NEEDS

The first step toward improving your lighting involves careful consideration of the design and layout of your rooms and the types of activities that take place in each one.

If you're planning new lighting, you may want to draw a basic room plan (if you're building or remodeling, you can trace your architect's plans). Note the location of some basic furnishings on your plan, as well. These sketches will help you determine where to place your fixtures, what kinds to use, and where you'll want new outlets or wall switches.

Lighting for active living

In working on your lighting plan, you'll find that some areas—including hallways, stairs, entries, closets, laundry areas, and workshops—host only one type of activity. These areas are the simplest to plan for; often, one level of light and one set of fixtures will be sufficient.

Family rooms, living rooms, and other multiple-use areas, such as great rooms, will present more of a challenge. Today's family room may be the site of such diverse activities as television viewing, entertaining, piano playing, reading, and model making. The light levels required for these activities range from very soft ambient light to strong directional task lighting.

Just as all of these activities aren't likely to be going on at the same time, you probably won't wish to have all the room's specialized lights on at once. What will be needed is a variety of light levels, sources, and controls.

To begin, look at the areas in your multiple-use rooms where the more exacting visual tasks are undertaken. If your family enjoys model making or working on puzzles at a table that doubles as a snacking area when you're entertaining, you might want a pendant fixture with a strong light controlled by a dimmer; the high wattage can

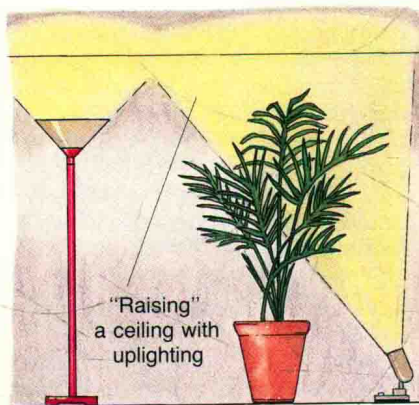
be used whenever puzzles or models are in progress and the dimmer used during entertaining.

An adjustable floor lamp or short track system above the piano can light both sheet music and the surrounding area when your piano student is at work. For reading or sewing, you can place a table or floor lamp with a three-way bulb next to an easy chair.

Lighting architectural features

You can use light both to complement the special architectural features in your house and to help disguise some aspects you'd like to downplay. As you walk through your house or go over your plans, try to focus on some of the ways light can work for you.

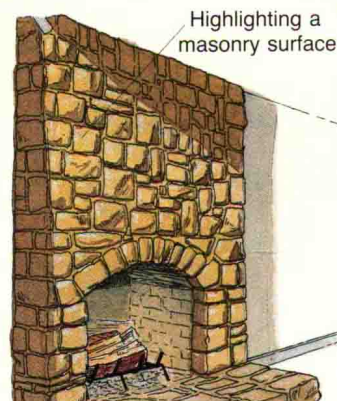
Ceilings can pose special problems or become special features. If your ceilings seem too low, bounced indirect light from uplights, torchères, or coves can help "raise" them.



Another common problem in older homes is rough or patchy ceiling plaster. For this problem and for ceilings that seem too high, the solution is the same: keep light off the ceiling surface by using downlighting, either from surface-mounted (not recessed) fixtures or pendant fixtures. The darker surface will seem lower, and imperfections will go unnoticed.

Masonry surfaces, such as brick walls or a stone fireplace, take on new beauty and importance when

lighted at an angle to play up their textures.



Room dimensions can "change" as a result of tricks played by light. Small rooms can become open and airy; large rooms can be made to appear cozy and inviting.

In a small room, washing the walls with an even layer of light seems to push them outward, expanding the space. If the wall is light colored, the effect is greater.

A large room illuminated with a few soft pools of light concentrated on important objects or areas becomes smaller and more intimate, as the lighted areas demand more attention than the room as a whole.

Narrow rooms benefit from trickery, too: lights along shorter walls draw the eye away from long ones, resulting in a "wider" space.

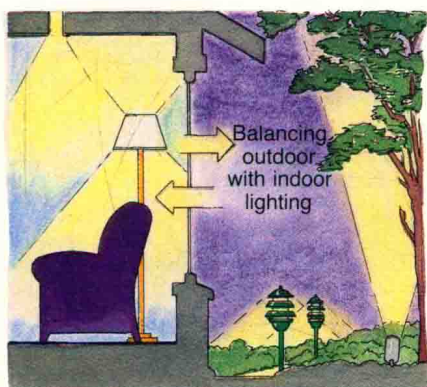
Cathedral or beamed ceilings can take on new importance with uplighting from coves or well-placed spotlights. Many designers are using beams to hold track lighting, taking advantage of architectural lines to disguise the lengths of track.

Mirrors should be lit from both sides to eliminate shadows. If there's no wall space for installing fixtures, try mounting wall sconces or strip lights directly on the glass. In a bathroom, you could substitute a continuous fluorescent strip along the top (be sure to choose one in a flattering color).

Windows, sources of daylight, can pose problems at night, when they seem like dark mirrors or black

holes if left uncovered. Bright diffusing lamps or fixtures can produce annoying glare and reflection in the glass.

One way to avoid reflections is to light the area outside the window to a high enough level that lights inside balance with those on the outside. This use of outdoor lighting also gives the effect of extending your living area.



Another solution is to use opaque pendant fixtures or recessed downlights; then, only the lighted areas can be seen, not the light sources.

Window seats with small built-in downlights or wall fixtures can become cozy corners at night.

Skylights with fixtures concealed behind diffusing panels, like the one shown on page 45, can give a feeling of continuing daylight, instead of becoming dark holes at night.

Solar rooms with a large bank of windows on the south or west side require some artificial light during certain times of day to counteract the contrast between the brightness of the sunlight and the shadows the sun produces.

Alcoves or niches lighted with a warm glow turn into focal points at night, for display or for simple variation in design.

Decorative features to consider

As you think through your home's lighting scheme, you'll want to consider several aspects of each room's decor. Basic design features,

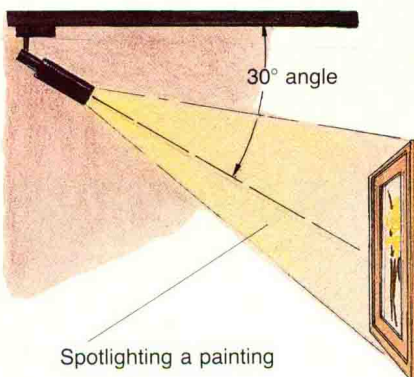
such as color (see page 6), the placement of furniture, and the display of decorative art, can make a difference in the placement, quality, and quantity of light you'll need.

Furniture placement dictates certain lighting needs. Consider the use of each piece of furniture in a given area. You may want wall fixtures above your buffet for serving and for ambient light. A free-standing wardrobe can be illuminated by a downlight for easier clothing selection.

Indoor plants need light to help them look their best—and to help them grow. Some plant lovers mix one watt of incandescent for every three watts of fluorescent light; a more convenient solution is to purchase special "grow bulbs."

You can silhouette plants with concealed uplights or by backlighting them against a luminous panel or lighted wall. Light bounces down through the foliage when a fixture is recessed in the ceiling or suspended from it. Fluorescent fixtures or strip lights mounted vertically on a wall provide even light for vines or indoor trees.

Artwork can be lighted in a variety of ways. For the most dramatic effect, spotlight works of art individually from above or below: a 30° angle is best—even less if you wish to play up the texture of an oil painting or woven hanging.



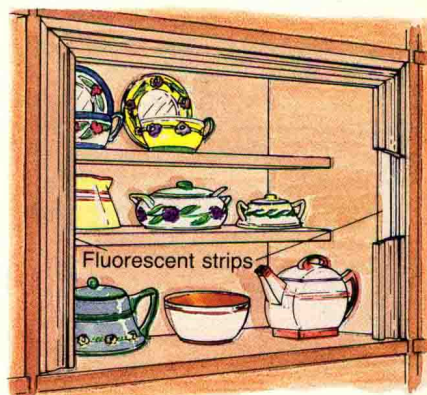
Frame-mounted picture lights are another option, though these may not illuminate a painting evenly. A more economical way to

light a group of pictures is by wall-washing evenly from above.

Sculpture and other three-dimensional objects usually call for lighting from both sides to minimize shadows. However, you can also emphasize shadows or a silhouette by aiming a single spot from behind or below. Don't hesitate to experiment to achieve the results you want.

Collections of books and records are best lit evenly; other items may require individual spotlighting. Fluorescent tubes or light panels produce the most even glow; canisters and mini-tracks are best for accenting.

Downlighting may result in top shelves casting shadows on the shelves below. Backlighting, vertical lighting from the sides, or lights attached under the front edges of shelves will eliminate this problem. Concealed fixtures help keep glare out of people's eyes and lend a clean look to your display.



Filling in dark areas

Once you've provided for adequate task and accent lighting, you should plan for some ambient, or general, light to soften the contrast between these light sources and the surrounding areas (see "General light levels," page 7).

Ambient light can be as simple as a diffused or dimmed fixture or lamp. It can also come from valances over curtained windows, fixtures bounced off the ceiling or walls, or indirect shelf or display niche lighting. Uplighting—in the form of cans, torchères, or built-in coves—creates an especially subtle touch in living areas.

LIGHT BULBS & TUBES

Light bulbs and tubes can be grouped in general categories according to the way they produce light.

Incandescent light, the kind used most frequently in our homes, is produced by a tungsten thread that burns slowly inside a glass bulb.

A-bulbs are the old standbys; these also come in three-way and long-life versions. *R*, *PAR*, and *ER* bulbs produce a more controlled beam; *silvered bowl* types diffuse light. A number of decorative bulbs are also available (see chart at right).























Low-voltage incandescent lighting for indoor use is new on the residential scene. Operating on 12 or 24 volts, these lights require transformers (which are often built into the fixtures) to step down the voltage from standard 120-volt household circuits. The small bulbs are especially useful in accent lighting, where light must be localized or precisely directed onto a small area. Low-voltage *mini-lights* are decorative in their own right.

Low-voltage fixtures are relatively expensive to buy; but in general, low-voltage lighting can be energy-efficient if carefully planned.

Fluorescent light is produced when electrical energy and mercury vapor create an arc that stimulates the phosphors coating the inside of the bulb. Because the light comes evenly from the entire surface of the tube, it spreads in all directions, creating a steady, shadowless light. Tubes require a ballast to ignite and maintain the electrical flow.

Fluorescent tubes are unrivaled for energy efficiency; they also last far longer than incandescent bulbs. In some energy-conscious areas, ambient lighting for new kitchens and bathrooms must be fluorescent.

Older fluorescent tubes have been criticized for noise, flicker, and poor color rendition. Electronic ballasts and better fixture shielding against glare have remedied the

		Type
Incandescent		A-bulb
		Three-way
		Long-life
		G—Globe
		T—Tubular
		Flame-shaped
		R—Reflector
		PAR—Parabolic aluminized reflector
		ER—Ellipsoidal reflector
		Silvered bowl
		Low-voltage reflector spot
		Low-voltage mini-lights
Fluorescent		Tube
		PL—Compact tube
		Compact
		Circle
Quartz halogen		High-intensity
		Low-voltage PAR
		Low-voltage MR-16 (mini-reflector)
High-intensity discharge (HID)		Mercury vapor
		Metal halide
		High-pressure sodium

Description	Uses	Efficiency (lumens per watt)	Bulb life in hours	Watts
Familiar pear shape; frosted and clear.	Everyday household use.	12 to 21	750 to 1,000	4 to 300
A-bulb shape; frosted. Two filaments provide three light levels.	In lamps with special switches in multiuse areas.	11 to 15	1,000 to 1,600	30/70/100 to 100/200/300
A-bulb shape; frosted. Lasts longer but produces less light.	In hard-to-reach fixtures.	12 to 17	1,150 to 3,000	40 to 150
Ball-shaped bulb, 2" to 6" in diameter. Frosted or clear.	Often decorative; without shades or in pendant fixtures.	12 to 21	1,500 to 4,000	15 to 100
Tube-shaped, from 5" long. Frosted or clear.	Appliances, cabinets, decorative fixtures.	7.5 to 10	1,000	15 to 60
Decorative; specially coated.	In chandeliers and sconces.	—	1,500 to 4,000	15 to 60
White or silvered coating directs light out end of funnel-shaped bulb.	In directional fixtures; focuses light where needed.	7 to 12.2	1,500 to 4,000	25 to 300
Similar to auto headlamp; special shape and coating project light and control beam.	In recessed downlights and track fixtures.	8 to 13	2,000 to 6,000	25 to 250
Shape and coating focus light 2" ahead of bulb, then light spreads out.	Can replace higher-wattage bulbs in recessed downlights.	11.3 to 12.3	1,500 to 4,000	50 to 120
A-bulb in shape, with silvered cap to cut glare and produce indirect light.	Can be used in track fixtures and pendants.	—	1,000	60 to 200
Similar to standard R-bulb; directs light in various beam spreads and distances.	In low-voltage track fixtures and recessed downlights.	—	500 to 2,000	15, 25
Like Christmas tree lights; encased in flexible, waterproof plastic.	Decorative, to add sparkle.	—	22 years (est.)	0.84
Tube-shaped, 5" to 96" long. Needs special fixture and ballast.	Shadowless work light; also indirect lighting.	48 to 90	6,000 to 20,000	8 to 80
U-shaped with base; typically 5¼" to 7½" long.	Some PL tubes include ballasts to replace A-bulbs.	43 to 70	10,000	7 to 28
Resembles oversize A-bulb, has screw base; comes in variety of color temperatures.	Replaces A-bulb; uses far less energy. Fits any standard lamp socket.	43 to 60	5,000 to 9,000	13 to 21
6" to 12" circle. Some types require special fixtures; others can replace A-bulbs.	In compact circle fixtures.	48 to 70	12,000	20 to 40
Small, clear bulb with consistently high light output; used in halogen fixtures.	In specialized task lamps, torchères, and pendants.	18 to 22	2,000	100 to 500
Similar to auto headlight; tiny filament, shape, and coating give precise direction.	To project a small spot of light a long distance.	—	2,000	25, 50
Tiny (2"-diameter) projector bulb; gives small circle of light from a distance.	In low-voltage track fixtures and recessed downlights.	—	500 to 5,000	25, 50
Bulb-within-a-bulb, shaped like an oversize A-bulb; needs special ballast.	Available as garden and security lighting for residential use.	63	16,000 to 24,000	50 to 1,000
Similar to mercury vapor, almost twice as efficient; needs special ballast and fixture.	Outdoor security lighting. Now available in table lamp wattages with self-ballast.	115	10,000 to 20,000	175 to 1,500
Similar to mercury vapor. Gold-hued light. Needs special ballast and fixture.	Outdoor lighting; used indoors commercially and industrially.	140	10,000 to 24,000	35 to 1,000

first two problems; as for the last one, manufacturers have developed fluorescents in a wide spectrum of colors, from very warm (about 2,700°K) to very cool (about 6,300°K).

U-shaped *PL* fluorescents allow fluorescent light to be used in smaller, trimmer fixtures—for example, recessed downlights. Compact and circle fluorescents can replace A-bulbs: you simply screw the tube or a special adapter into a standard lamp socket.

Quartz halogen bulbs contain a tiny quartz filament that produces a brighter, whiter beam than other light sources. They're excellent for task lighting, pinpoint accenting, and other dramatic effects.

Halogen is usually low-voltage but may be standard line current. The popular *MR-16* bulb creates the tightest beam; for a longer reach and wider coverage, choose a *PAR* bulb. Both *MR-16* and *PAR* bulbs are available in a variety of beam patterns, such as *VNSP* (very narrow spot), *SP* (spot), *NFL* (narrow flood), and *FL* (flood). An abundance of smaller bulb shapes and sizes serve other lighting needs.

Halogen's one disadvantage, besides the initial cost, is that it's very hot. Halogen bulbs require halogen fixtures. Be sure to shop carefully: some fixtures on the market are not UL-approved.

High-intensity discharge (HID) bulbs produce light when electricity excites specific gases in pressurized bulbs. Requiring special fixtures and ballasts, these lights may take up to 7 minutes to ignite after being switched on. The color emitted by some HID bulbs is rather unflattering, but they offer long life and high efficiency.

Neon light is also generated when electricity passes through a gas: neon gas, for example, glows orange red (other gases give off a variety of colors). Neon tubes' low light output makes them undesirable as a functional light source. Requiring a 24-volt transformer, neon fixtures can be expensive to buy, though they don't use much energy and may last for years.

Cold cathode, a close cousin of neon, puts out more light and is useful for general or indirect lighting as well as for decoration.

SELECTING LIGHT FIXTURES

Once you've determined the quality and quantity of light you need, you're ready to visit the local lighting, hardware, or electrical supply store—or are you?

Put off that trip for a bit and make it a point to observe the lighting around you in restaurants, stores, or a neighbor's house. Look for "living" examples of all the types of lighting presented in this book and sort out those you prefer from those you don't like. Then, with your needs and preferences in mind, you'll be ready to hunt for the fixtures that provide exactly the type of lighting you want.

Factors to weigh in choosing fixtures

If you've formed some ideas about the kinds of lighting you need, selecting fixtures would appear to be easy. But given the great variety available today, finding the right fixtures can be confusing and complicated. Here are some points to keep in mind.

Function. All types of lighting systems include fixtures that give strong directional light, general diffused light, or a combination. One of the primary considerations about any fixture is how it directs the light. Will it put the light you want where you want it?

Make sure that directional fixtures have a high enough maximum bulb wattage to allow you to use bulbs strong enough to "throw" the light from the fixtures to task or display areas.

Size. Fixtures on display will often look smaller in the store than they will in your home. Take measurements of your top choices; then find bowls or boxes of the appropriate sizes at home and hold them in place to determine if the fixtures you have in mind are the proper scale. Manufacturers often produce standard fixtures in graded sizes, so be sure to ask suppliers about other sizes.

Design. Here, personal taste will be your guide, leading you to

whatever suits your decor. Designers and architects have found that a sense of decorative continuity can be created by the use of similar fixtures throughout a home. In response to this, manufacturers offer "families" of fixtures available as spotlights, pendants, track lights, and ceiling fixtures.

Flexibility. Because tastes and habits often change, flexibility is an important consideration when choosing fixtures. If you change your display of artwork, you'll want to adjust your lighting, too.

Movable or adjustable lamps are longtime favorites partly because they're so flexible. With track systems, you can alter the location of fixtures along the track as well as the way each fixture is aimed. Even some built-in recessed downlights have changeable trim, so that a regular downlight can become a pinhole light or an eyeball.

Cost. You'll want to consider both purchase price and operating costs in selecting light fixtures. When a fixture is to be kept burning for several hours at a stretch, it may be wise to invest in a more costly low-energy unit than to buy a less expensive kilowatt-eater.

More expensive fixtures are likely to offer greater flexibility and higher engineering quality, producing more controlled light; you may want to use these in your living room or wherever such quality is important.

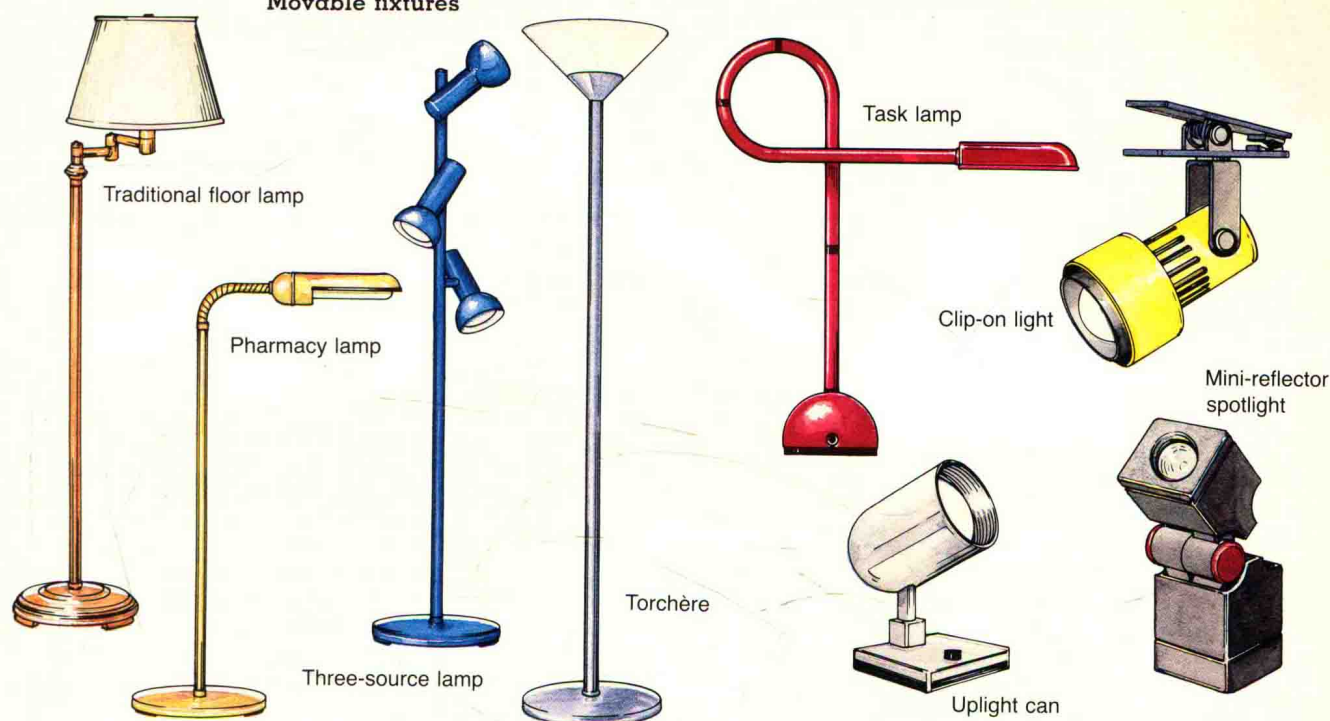
Maintenance. To operate efficiently, all fixtures should be cleaned regularly. Kitchens, bathrooms, and work areas demand fixtures that are easy to clean. Since all light bulbs must be changed eventually, consider using a simple fixture with a long-lived fluorescent bulb for the top of the stairs and other hard-to-reach spots.

Movable light fixtures

Table lamps, floor lamps, and small specialty lamps are easy to buy, easy to change, and easy to take along when you move. Within this category you'll find fixtures that will provide any quality of light you need.

Table lamps show individuality and style at the same time that

Movable fixtures



they serve as sources of light. Variety, mobility, and ease of installation add to the appeal of such lamps. Styles range from quietly traditional to brashly avant-garde.

The choice of a lampshade can be crucial to the effectiveness of a table lamp. A difference of only 2 inches in the diameter of the lower edge of the shade can make a significant difference in the spread of light shed by a lamp.

The height of the bulb within the shade also affects the circle of illumination: light will spread farther when the bulb is set low in the shade. Small extension screws used on the lamp harp to adjust the height of the shade are available at most lighting supply stores.

Floor lamps offer great flexibility. One type—the *traditional floor lamp*—often provides a combination of levels, serving either as a reading light or as a source of soft ambient light. Unobtrusive *pharmacy lamps* offer options, too, especially for tasks such as reading and sewing. Lamps with adjustable directional fixtures, such as *three-source lamps*, are a practical choice for task lighting.

Bright *torchères*, available in both halogen and incandescent versions, bounce light onto the

ceiling for a dramatic form of indirect lighting. However, the standard 8-foot ceiling is often too low for the typical 6- to 6½-foot-high torchère. In this case, look for a lamp with a built-in diffuser to avoid a hot spot. Some torchères include a dimmer unit for controlling the light output.

Specialty lamps in new varieties are constantly appearing on the market. These new lamps, like the traditional picture light and drafting table lamp, can fill a definite need while remaining movable, and they require no special wiring.

Easily adjusted *clip-on lights* are practical for providing task lighting over beds, desks, and shelves. *Uplight cans* highlight indoor plants or wash walls with light for instant decorating touches. *Mini-reflector spotlights* are handy for pinpointing paintings or sculpture from a nearby mantelpiece or shelf.

Adjustable task lamps supply a small, bright pool of light while leaving your immediate work area uncluttered. Halogen lamps produce the cleanest, tightest beam, while PL fluorescent models are tops for reducing glare and shadows.

Surface-mounted fixtures

Installed either on walls or on ceilings, surface-mounted fixtures (shown on page 14) are integral to most home lighting designs. Generally, surface-mounted fixtures can be added without a great deal of wiring work.

Ceiling and wall fixtures provide general illumination in traffic areas such as landings, entries, and hallways, where safety is a consideration. Kitchens, bathrooms, and workshops benefit from the added light from ceiling fixtures used in conjunction with task lighting on work surfaces.

Fixtures in this category range from functional frosted-glass globes to delicate, candlelike sconces. When selecting a fixture, look closely at the amount of light that bounces off the wall or ceiling to be sure the light will be directed where you want it. In some localities, new kitchens and bathrooms must be outfitted with fluorescent fixtures.

Wall sconces are great for hallways and for indirect lighting along walls. Place sconces about 5½ feet from the floor; keep them away from corners—otherwise, they'll create hot spots.