



Illuminating
ENGINEERING SOCIETY

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LIGHTING YOUR WAY TO BETTER VISION

The American Optometric Association, representing more than 35,000 doctors of optometry, optometry students, paraoptometric assistants and technicians, is pleased to support the information contained in *Lighting Your way to Better Vision*. As the aging adult population continues to increase in North America, quality lighting's role in meeting the needs of an aging visual system becomes ever more important.

As we age, even healthy eyes become more sensitive to glare - they require higher contrasts to see than they did when we were younger, as well as higher illumination levels. The need for higher light levels also means that control of sources of light is especially important. The recommendations included in this brochure are critically important if ocular diseases, such as age-related macular degeneration or diabetic retinopathy, affect one's vision, or low vision aids are prescribed by an optometrist to maximize one's remaining vision.

The combination of regular, comprehensive eye examinations and quality environmental lighting can enhance the visual experience and maintain productivity for a lifetime.



American Optometric
Association



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As we get older, nothing is more frustrating than not being able to see as well as we used to. An eye examination and new glasses can be a big help, but proper lighting is just as critical.

Whether seniors continue living in their own homes, or move to an apartment or retirement community, lighting is going to become an ever more important part of everyday life. It will add to comfort and enjoyment. And, it will help keep seniors safe.

This brochure describes some of the changes that can be made to a home's existing lighting to make it more comfortable and secure. Some solutions are easily accomplished; for example, by plugging a new fixture into an electric outlet. Others require changing fixtures or providing additional electrical boxes for new ones. It is recommended that these changes be done by qualified people.

Understanding the basics of lighting.

- Ambient lighting is general lighting in a room for walking around, conversation and identifying objects.
- Task lighting provides higher light levels in a specific area for performing visual tasks, such as reading sewing, and cutting.
- Accent light is used to highlight artwork or special architectural features.
- Daylight from windows and skylights can also provide ambient lighting, Due to the high light levels, some people also use daylight or direct sunlight for visual tasks such as mending or working on puzzles.
- Interior surfaces contribute to good lighting Lighter colors on ceiling and walls will reflect more light within a space. Dark colors absorb the light and should only be used on moldings or small areas. To better control glare, ceilings and

walls should also have a flat finish paint or general areas and a matte finish for kitchens and bathrooms.

- Many successful lighting solutions use a combination of the above.

What constitutes good lighting for us as we age?

- Ambient lighting that is uniform within a room and from one room to another. Why? Because older eyes take longer to adjust to changes in light levels.
- Higher levels of light. Why? Because normal age related changes within the eye restrict the light coming in and absorb the light – so more light is needed to compensate.
- Glare-Free light. Why? Light scatters within the eye causing an increased sensitivity to glare and the loss of the ability to see subtle details at lower light levels.

- Light that helps you distinguish colors. The lens of the eye yellows with age, so proper lighting can help compensate.
- Light fixtures that do not flicker or hum, such as the problems caused by older fluorescent lights that use magnetic ballasts. Fluorescent fixtures with high-frequency electronic ballasts do not have these problems.

Simple modifications to your home can make a big difference



Ambient light is provided for this front porch by surface mounted porch ceiling fixtures with diffusing lenses. These fixtures provide light for the walkway, the house numbers and on the face of a visitor at the door, leaving no dark corners for an intruder to hide.

Let's start outside

Lighting the pathway

Typical porch lights with clear glass and small bright light bulbs can cause glare and make it impossible to see steps or level changes. Pathway lights should be provided between parking



This back porch utilizes two light sources. The recessed downlight provides light onto the door and landing area. A rope-light mounted under the lower rail provides light on the stair tread, while concealing the light from the eyes. This is also an excellent way to provide lighting for interior stairs.

areas, or the garage, and the entry to your home. And the general entry area should be lighted to eliminate dark corners and shadows from shrubbery. Energy-efficient long life bulbs and diffusing lenses are most effective. Automatic controls utilizing photocells and/or motion sensors to turn lights on at the onset of darkness will guarantee the light will always be on when needed.



These steps are clearly marked with a white line, providing an excellent visual cue that will help to prevent falls. By providing edges with a contrasting strip, everyone can see better, especially at night.

Paying special attention to exterior stairs

A single light source mounted at the head of the stairs may not be adequate to light the entire flight. Concealed rope-lights attached to the underside of the stair rail, or solar powered or electrically powered step lights will provide additional light on stair treads.

Making house numbers easy to read

How many times have you tried to find a friend's home and found it nearly impossible to read the numbers on the front of the houses? Large and lighted house numbers that are white against a dark background will easily solve this problem.



These numbers are easy to find and read during the day. The same numbers are illuminated from the back for ease of seeing at night.

Inside, bring the outside light on

If you've lived in your home for a number of years, chances are good that the lighting hasn't changed much since the house was built. You probably have incandescent fixtures...the ones that take the standard light bulbs we're all used to. Do you know that most of the energy from those bulbs goes into heat while only approximately 10% goes to light, which results in higher operating costs?

Some simple modifications, such as switching to fluorescent bulbs will also help to reduce your utility bills. Today's fluorescent light technology is far superior to earlier versions - no flicker, hum and good color.

Take a moment to look around each room. If you have heavy draperies or valances on the windows blocking the daylight, you can immediately improve the lighting by removing them, and replacing them with woven shades or sheer curtains, which will reduce glare, diffuse daylight and allow light into the room. Add a separate window covering for privacy in bedrooms and bathrooms. If budget allows, consider adding skylights to the living room, kitchen or hobby area. This is a very effective and efficient way to balance the daylight from windows.

Making living rooms and family rooms more livable

Typically, these rooms are used for visiting with family and friends, watching television and reading. A good balance of daylight and ambient light, with the addition of some well-placed floor lamps and table lamps will make this space much more comfortable. Special attention should be paid to where the television set is placed, so that there is no reflected light from either the windows or light fixtures. If a computer is used in this room, the same guidelines apply.



Daylight in this condominium has been balanced with ambient light from dimmable hanging fluorescent ceiling fixtures. These fixtures bounce light off the ceiling and provide light downward. This type of fixture is referred to as a direct/indirect fixture.



A skylight was added to the living room of this 1920's style bungalow to help balance the daylight coming from the windows and provide high light levels during the day.



In addition to the ambient light, task reading lights provide higher levels of illumination needed for reading.



This computer monitor has been positioned to avoid direct daylight upon the screen. An adjustable task light directs light upon the desk, and not on the screen. A perimeter light valance provides the room with ambient light by bouncing light off the upper wall and ceiling.

Brightening up the kitchen

Good task lighting is needed for food preparation, cooking and working at the sink. Since many people must take medication with their meals, appropriate light for reading the labels is also very important.



Another example of using skylights to balance the daylight coming from the windows. A task light is positioned for reading.

Adding under-cabinet fluorescent fixtures (with shields to block direct view of the light source) will distribute a glare-free shadowless light evenly on the work surfaces. An over-the-sink fluorescent light may be recessed, concealed with a valance or ceiling mounted above the sink. If there is room, strip fluorescent fixtures placed on top of the cabinets reflect light off the ceiling to create an inexpensive indirect, ambient lighting scheme which is diffused and glare-free. If there are soffits above the upper cabinets, a light valance may be added to the front surface to provide both indirect ambient light and task, lighting for the counter top.

Placing contrasting light or dark placemats or cutting boards on counter tops can make it easier to pour liquids and accomplish other food preparation tasks. Adding a contrasting edge to the counter will also help to define the surface area, and cut down on breakage or spills from misjudging the edge of the counter. Cabinet interiors should be white or light in value to aid in viewing the contents.

This kitchen uses a combination of ambient light:

- 1 Fixtures mounted above the upper cabinet.
- 2 Task lighting from fluorescent fixtures mounted under the upper cabinets.
- 3 Halogen task lights focused at an angle across the sink.
- 4 Two amber hanging fixtures provide light for the bar and add visual interest.



Strip fluorescent lights located above the upper cabinets provide an inexpensive indirect lighting solution. Task lights placed under these same cabinets deliver brighter light to the stove and work counters.



This typical ranch-style home built in the 60's originally provided only one recessed incandescent downlight to light the sink area. Nothing was provided for the counter. A light valance was installed on the existing soffit and the power was re-routed from the single downlight to the valance, giving light to the whole length of the counter in addition to the sink.



Multiple levels of light are provided by the pendant fixture over the table and fluorescent valance lighting. Each is on a separate dimming control, allowing for softer light for dining and brighter light for reading at the table. The design of the fixture shields the brightness of the bulb from the eyes.

A large hanging fixture, with a dimmer to control the level of light provides soft light for dining, and can also provide additional lighting for reading or to balance the daylight when the window shades are open.

Photo courtesy. Clark Anderson

Providing better light on the dining room table.

Just think of all that you do sitting at your table. You eat your meals there, of course, but you probably also use it to do paperwork, work on hobbies, or read the newspaper. Dining areas are often part of a living room or kitchen, and share the available ambient room light. When they are in a separate area, ambient light can be improved with carefully selected fixtures, such as a light valance or wall-wash fixtures, or floor lamps placed in room corners.

Task lighting may be located above the dining table, but the light level should be adjustable, since dining does not demand the same level of



light required for reading tasks. Care should be taken to avoid glare, and light sources above eye level should be shielded by the fixture or with frosted glass, fabric shades or materials that soften and diffuse the light.

Preventing accidents in the bathroom

A combination of ambient and task lighting will provide the best illumination here. The light needs to be bright enough to allow you to read labels on medication bottles, but special care also needs to be given to wall and counter surfaces, which should be of light to medium color value, with matte finishes to reduce glare.



Lighting installed at each side of this mirror provides a good balance for general grooming. Additional ambient light is provided by the fluorescent fixtures placed out-of-sight behind the top of the curved wall.

Design Derek Poster Studio

Photo: ©michael spillers 2004



This mirror has been installed with no counter in front. Light coming from each side provides equal illumination to all parts of the face for shaving and applying make-up.

Mirrors are a special challenge. If the mirror is wide, a double row of fluorescent tubes in a soffit or valance above the mirror will provide light downward, but will create shadows. The best option is to place lights on both sides, centered at your eye level. This will give you the most complete view of your entire face. If space allows, install a separate lighted mirror without a counter in front, which will allow the viewer to stand closer. For those with bad backs or difficulties with balance, having a counter in front becomes an obstacle. A grab bar may be provided for stability.



A skylight placed over the tub provides an excellent lighting solution during the day, with additional electric lighting provided at night.

Lighting the night time path

For those who get up at night to use the bathroom, an illuminated light switch near the bed and night-lights should be provided for safety. Warm-colored night-lights should be located low on the wall to light the way. Light levels in the bathroom should be low so at night the eyes do not have to adjust to bright light and then readjust to the dark bedroom. Existing incandescent fixtures should be on dimmers to provide low light levels at night.

Controls for general lighting in the bathroom may be located outside the door to make it easy to enter an otherwise dark space. Actually, this is a good idea for any room in the home.

Bathing areas require extra attention

Sufficient lighting is even more important here since most people remove their glasses while showering and bathing. Lighting must be provided which will not be blocked by the shower curtain or obscured by mist and fog.



An example of how to place a “wet-location” light over a shower.

Rope-lighting controlled by a switch or motion sensor provides appropriate warm, low-level night lighting for bathrooms. Typical rope lights are sold with a cord and plug for ease of installation.



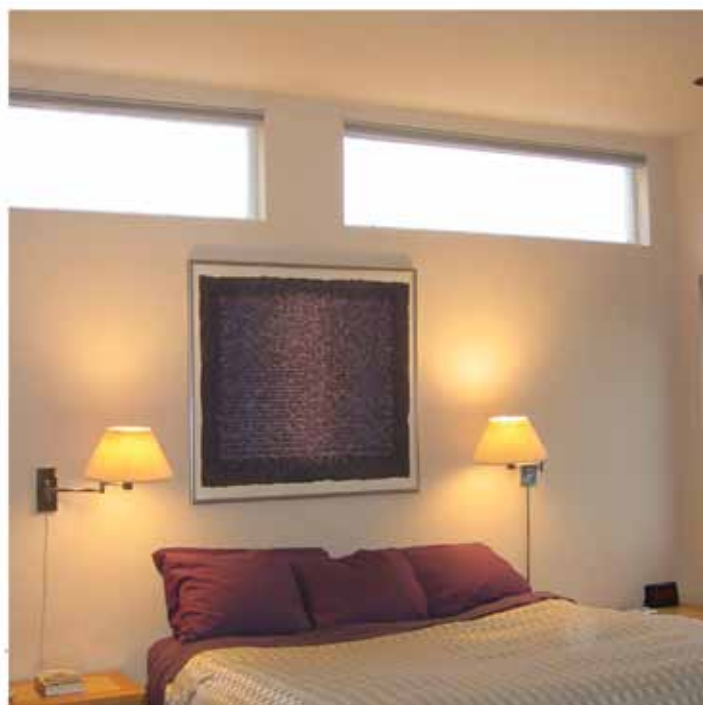


Making the bedroom more comfortable

Because many people have trouble sleeping during the night, they tend to nap more during the day. Consequently, they spend more time in bed. Therefore, more activity takes place here, including talking on the phone, watching television, listening to the radio, taking medication, and reading. Moving safely about in the bedroom requires ambient lighting. It is important to balance the daylight and ambient light in the space. This will alleviate eye fatigue, making it easier to stay awake while reading or watching television.

Bedside task lighting should be adjustable and be easy to reach while in bed, with controls that are accessible (a touch-activated) sensor base or easy-to-feel button placed on the bedside table.) Fluorescent bulbs with warm color are recommended instead of incandescent bulbs which produce heat.

A skylight brings in abundant daylight above the field of view to balance the brightness of the window, thus preventing glare. Light from the bedside table lamps provides task lighting.





Mounting a fluorescent fixtures in the center of this walk-in closet provides lighting for hanging items, as well as those stored on shelves. The fluorescent tubes have a high color rendering index (CRI) of 82, which is good for matching colors. * (It is recommended that electrical changes be done by qualified people.)

Don't overlook the closets

It's very difficult to select what you're going to wear when you're looking into a dark closet. A fluorescent fixtures should be placed so that light will fall on the front of hanging items and on areas between shelves.

Making a special place for hobbies

One of the things people look forward to when they retire is being able to spend more time pursuing their hobbies, whether it's something as simple as sitting in a chair reading or knitting, setting up an easel to paint or putting together a complete woodworking shop. No matter where the interest lies it will be much more enjoyable in a safe, well-lighted environment. An adjustable fluorescent task reading light may be sufficient for a small area, but woodworking shops present a bigger challenge. General shop lighting with additional task lighting may be required in these areas, depending upon the tools being used. It's very important that fluorescent fixtures in these environments have electronic ballast to prevent a strobe effect. The old-fashioned magnetic ballast might make a rotating blade appear to be stationary.



This sunroom provides abundant natural light for having breakfast, reading the paper and sewing. Additional task lighting is provided at the sewing machine for evening use or dark days. Shades on the curved sunroom windows adjust to control the daylight.



This is an excellent setting for a painting studio, with plenty of natural daylight coming from the skylight and windows.



Fluorescent shop fixtures provide the ambient light while track lighting provides flexibility for aiming light directly onto the task in this woodworking shop.

Design and Photography: Jeanne Halloin

How to get what you want

We've deliberately tried to stay away from using technical terms in this brochure. But when you go to the store, or talk with a handyman or contractor, this additional information will help them guide you in your purchases.

- **Ambient lighting:** Look for fixtures that are designed to conceal the light bulb/tube from view or have a diffuser to diminish the brightness of the bulb/tube to control glare.
- **Lighting that is directed to the ceiling and walls** will provide ambient light. Options include fluorescent fixtures installed out of sight, a light valance, wall wash fixtures, or a torchiere.
- **Task Lighting:** Installed fixtures or portable table/floor lamps with adjustable lighting levels to provide higher light levels in a specific area.
- **Specifics about fluorescent lighting:** When possible, use fixtures with long (48") T-5 or T-8 fluorescent tubes. (T-5 tubes are 5/8" in diameter; T-8's are 1" diameter.) They produce more light for the energy used. Always use electronic ballasts in fluorescent fixtures. These ballasts do not hum or flicker like the older and less efficient magnetic ballasts. Fluorescent sources are available in a range of color temperatures from warm to cool. A warm color similar to an incandescent bulb is described as 3000 Kelvin, whereas, a cool color similar to daylight is 5000 Kelvin. 3500 Kelvin offers a good blend between warm and cool. The color rendering index (how true colors will appear) should be 80, or above.
- **Paint the walls and ceiling** with a lighter color, using a flat finish in general areas, or a satin finish in kitchens and bathrooms. Most paint companies list the light reflective value (LRV) of each paint color either in the index or on the paint chip. Suggested range for the ceiling is an LRV of 75-90 and the range for the walls is an LRV of 60-80. The higher the number the more light will be reflected.
- **Windows and skylights:** Daylight within a space should be balanced, either by providing it from more than one direction (from opposing walls or skylights) or by increasing the electric lighting. Windows must have woven shades or sheer draperies to filter the daylight and control glare. Skylights without direct sun exposure and/or with adequate shading may be clear glass or plastic. All others should have diffused glass or plastic to prevent glare and strong shadows in the space.

Planning to downsize?

So far we've talked about making adjustments within your existing home. But if you're planning to move to an apartment or condominium, many of these same suggestions will still apply. You may need to ask your landlord or builder to make some modifications for you. Or, if you're moving into a retirement community, you'll need to talk to the management. Don't assume that the lighting in a retirement community will meet your needs. Be certain to visit both during the daylight hours and in the evening before making a decision. This will tell you how much daylight comes in and also how much lighting is built-in. It is not safe to light a living room, family room or bedroom with only portable table and floor lamps since most controls for switched receptacles are not located for both entering and exiting a space. It is also difficult to achieve an even and consistent light level using only table and floor lamps without the space looking like a lighting showroom.

Here are some questions you'll want to ask about your new home's lighting.

1. Is there adequate lighting in the parking area, and from there to the entry? Are steps and curbs marked with white or yellow strips to indicate a change of level?
2. Are all steps properly lighted to help prevent falls? Both inside and out?
3. Is the lighting in the corridors even and consistent with adequate light to read the apartment number and get the key in the keyhole? Is there an excessively bright window at the end of the corridor that causes glare? Are corridors carpeted? If the floors are wood or vinyl, has lighting been placed to reduced glare?
4. How many windows will there be in each room?
5. Is the light pleasant, or does it produce glare? Does the lighting create strong shadows? Is the lighting indirect, filling the space with light, or are the fixtures recessed making the ceiling dark and cave-like. Do they provide balanced light that is even and consistent?
6. Are the light controls for the bedroom and bathroom illuminated with a glowing switch?
7. Where are lights placed relative to mirrors?
8. Is there lighting in the closets?
9. Are fluorescent task lights installed underneath the cabinets in the kitchen?
10. What types of hobby areas are available? What type of lighting is provided?

With just a little planning, some labor, and not a whole lot of expense, you can continue to live in your home, or move to a new place and live in a well-lighted, comfortable, supportive, and safe environment that will keep you active and involved in all your favorite activities.

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Eunice Noell-Waggoner, President

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Clark Anderson (breakfast room page 10)

Derek Porter, Derek Porter Design Studio and

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Jeanne Halloin, Harts Design, Inc. (workshop page 11)

Additional Lighting and Vision Resources:

Illuminating Engineering Society of North America (www.ies.org)

Center of Design for an Aging Society (www.centerofdesign.org)

American Optometric Association (www.aoa.org)

Lighthouse International (www.lighthouse.org)

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