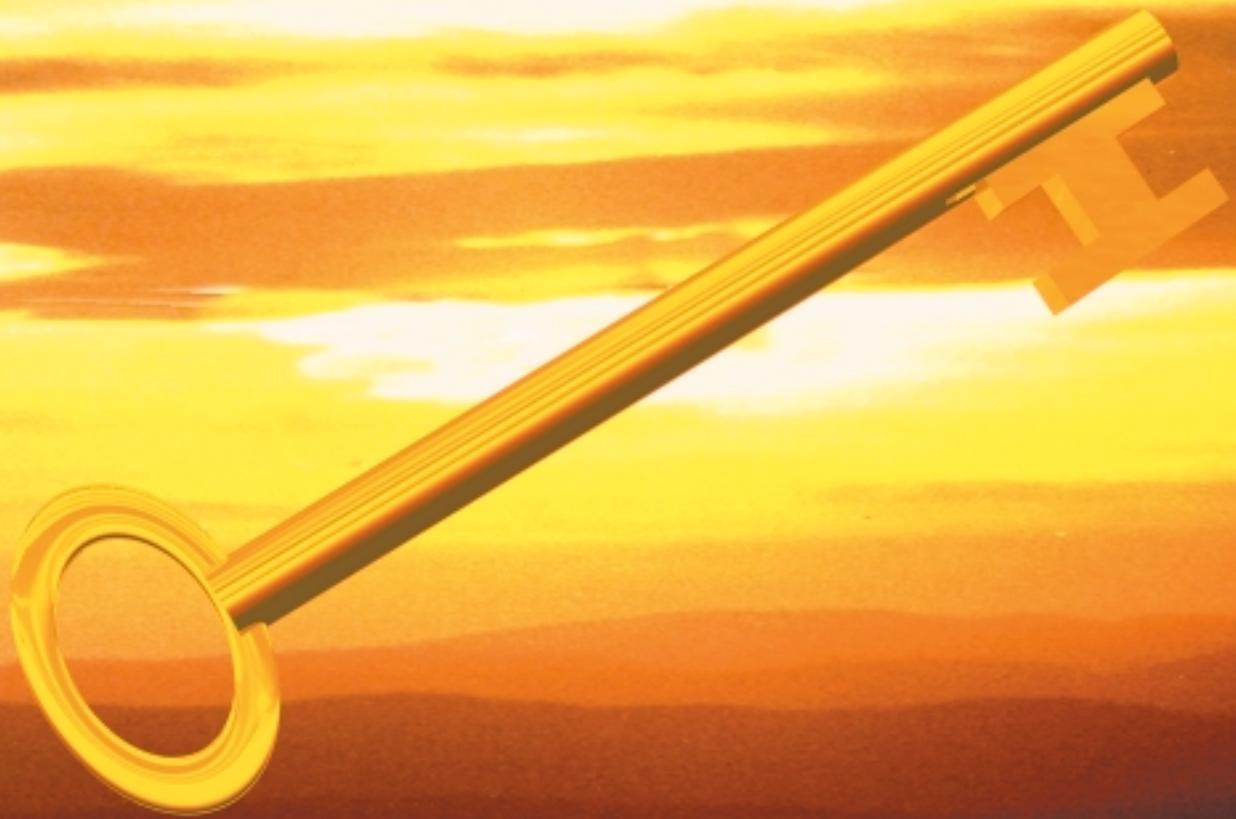


Lighting the Way:

A Key to Independence



Mariana Gross Figueiro



**Lighting**  
Research Center



## Introduction

Everyone's vision deteriorates with age, but there are ways to lessen its impact. Good lighting can make the difference between seeing and not seeing for older adults.

This publication answers common questions about vision and lighting posed by older adults, and offers practical solutions to help them, their families, and their caregivers to light their home for easier and more comfortable seeing.

## Helping Older Adults See Better

### As I grow older why is it harder for me to see?

As you grow older, less light reaches the back of your eyes. Your pupils get smaller as you age, and the lens inside your eye becomes thicker, absorbing more light. The lens also scatters more light as you age, adding a “luminous veil” over images on your retina, which reduces the distinctness (or contrast) and sharpness of objects and the vividness of colors. Reds begin to look like pinks, for example. You might have an even harder time seeing differences in blue colors, because your eye’s lens absorbs more blue light.

### How can lighting help me see better at home?

To help overcome the normal changes that occur in your eyes, lighting should be:

- High. Increase light levels by adding fixtures close to your task or selecting light bulbs with more lumens listed on their package. Even more light is required to see small details.
- Glare-free. Avoid direct view of light bulbs, use blinds, shades, or curtains to minimize brightness of windows, and be aware that shiny surfaces can reflect light from bright, glary objects into your eye.
- Uniform. Minimize dark areas within a room.
- Color enhancing. Use light bulbs with good color properties to help you discriminate colors.



Put extra light where you read. Fixtures that brighten your walls and ceiling, and fixtures that light your reading area improve your comfort and ability to see.

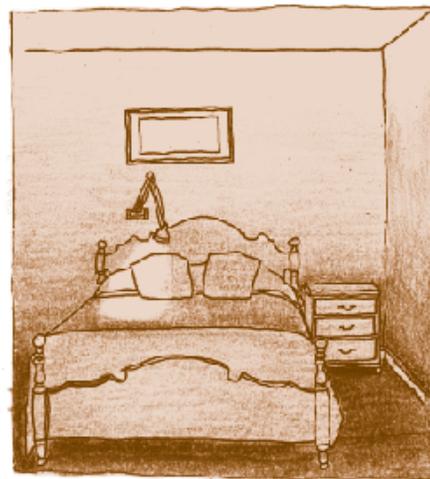
## How can I see small details better?

You can see small objects like fine print and sewing better when you have more light. A task light is a light fixture designed to direct light to an area where you need to see small details. The closer the task light is to the object you wish to see, the easier it will be to see fine details as long as the light still covers the whole object. You will be able to see small things better if you:

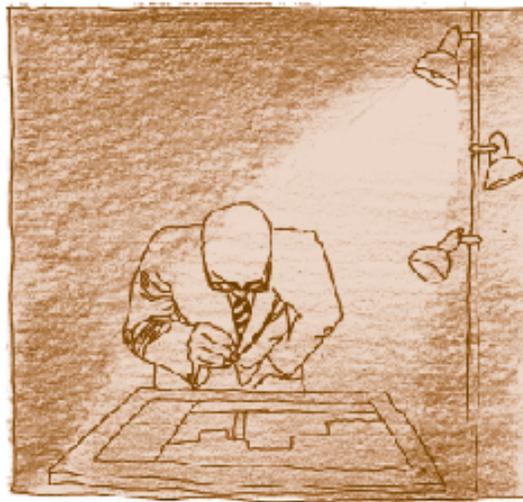
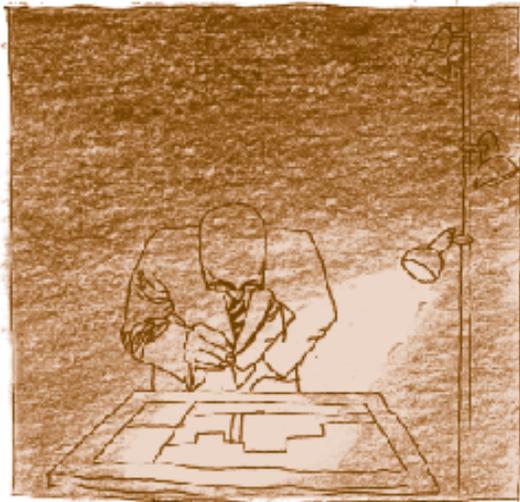
- Place adjustable task lights, floor lamps, or table lamps near your table, desk, bed, or objects with fine detail.
- Place your task light on your left side and slightly to the front if you are right-handed. Place it to your right and slightly forward if you are left-handed. This will reduce shadows cast by your hand on your paper, cutting board, or other task surface.
- Place fixtures over the sink, stove, countertops, and other fixed work areas. Avoid placing fixtures on the ceiling behind you when you stand at a counter, table, or sink. Fixtures located to the side and slightly in front of you will keep your shadow off your task surface. Use light-colored décor to reduce shadows.
- If you have upper cabinets, light your countertops with thin, undercabinet lighting fixtures mounted on the underside of the upper cabinets.
- Mount swing arm lamps used for reading in bed above the head of your bed or to your side, below your eye level.



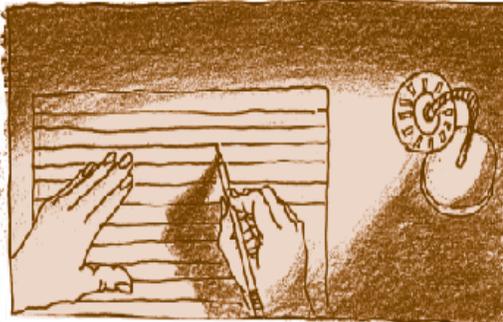
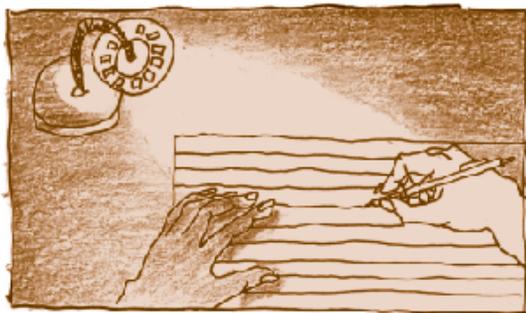
Place a task light over your shoulder, close to where you read.



You can read well in bed with an adjustable task light mounted over the headboard.



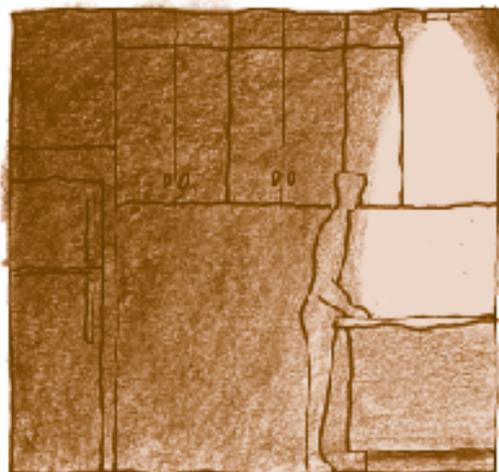
You can see fine details better when the task light is close to the task.



a.

b.

Place your task light slightly to the front and on the opposite side of the hand you write with (a) to avoid shadows (b).



a.

b.

Place a light fixture over the counter between you and the wall (a) to avoid shadows on your work area (b).



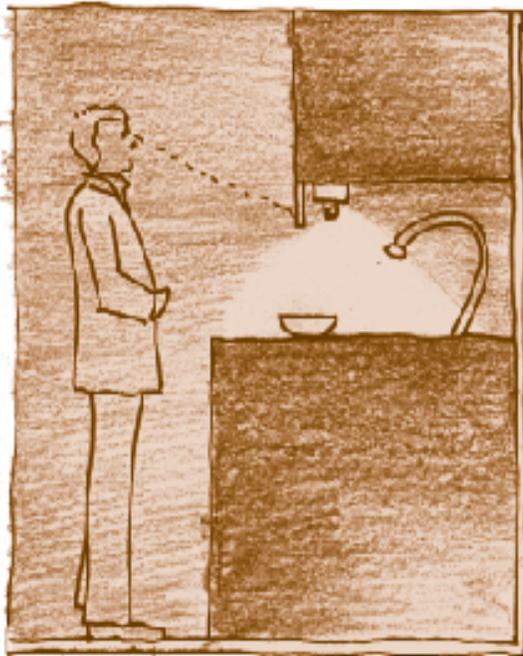
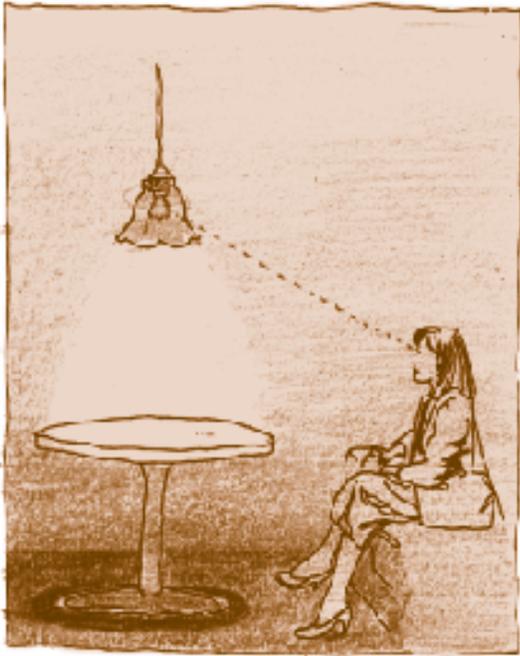
## How can I get rid of glare?

Everyone is bothered by glare when looking at something very bright against a darker background. To minimize glare:

- Avoid placing very bright lights against dark ceilings or walls. Choose light-colored walls and ceilings to soften the effects of bright light.
- Shield bright objects from your usual lines of sight. For example, if you can see a light bulb when seated at your dining table, hide the direct view of the bulb by adjusting its shade or repositioning the fixture.
- Avoid clear lenses or shades on fixtures; they do not shield the light bulb from your view.
- Spread light over large areas by lighting ceilings and walls, or by using fluorescent tubes shielded from direct view.
- If you want recessed downlights or “cans” mounted in your ceiling, choose a deeply recessed fixture to minimize direct view of the bulb.
- Place task lights to your side, not in front of you, to avoid reflected glare from shiny surfaces, like polished wood or glossy magazines.
- Use shades, blinds, or curtains to minimize glare from windows.



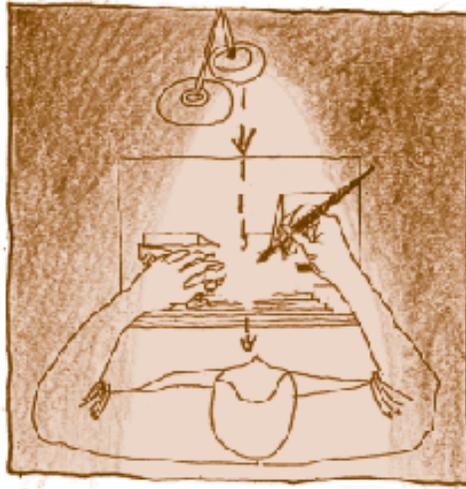
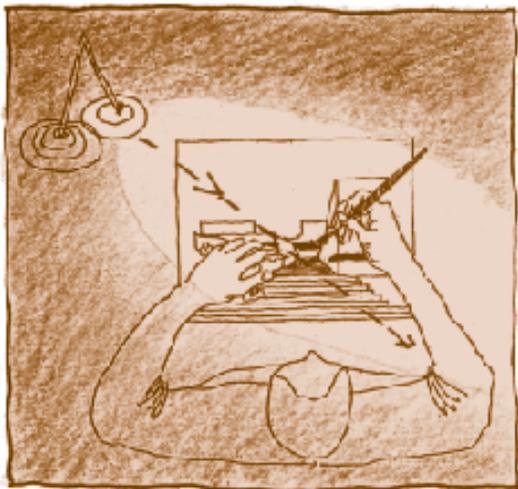
Aim lights on the object you want to see, not on your face.



a.

b.

Block your direct view of light bulbs with a shade (a) or shielding board (b).



a.

b.

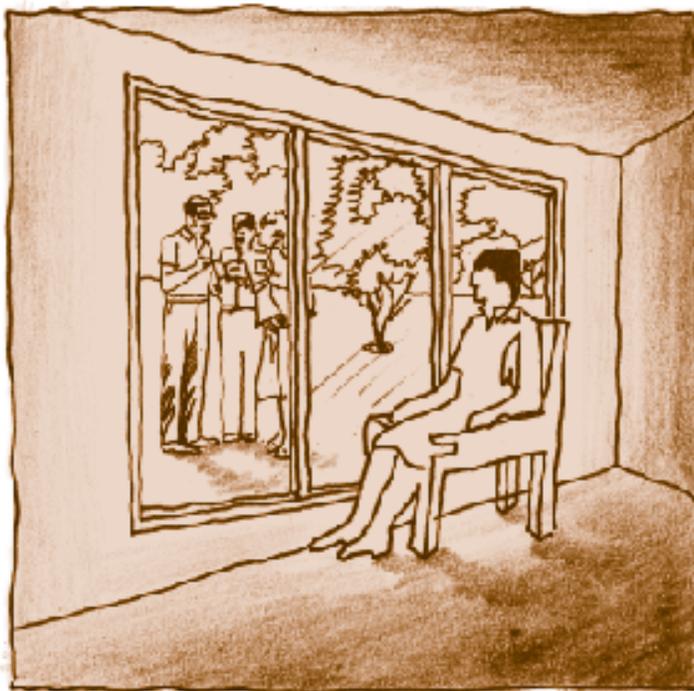
Place your task light to your side (a) to avoid glare bouncing off shiny surfaces (b).



## Will light help me stay more alert?

There is growing evidence that bright light during the day coupled with darkness at night can help you be wider awake during the day and sleep more soundly at night. You should:

- Go outside in the daylight or sit right next to a bright window for at least an hour in the morning.
- Avoid bright spaces late at night.



Spend some time each morning in a bright place.

## What light bulbs should I look for?

Fluorescent tubes, when properly selected, offer you many advantages over common incandescent bulbs. You will not usually get burned by touching them, they spread light over large areas without excessive glare, and they last 10 to 20 times longer than incandescent bulbs so you will rarely have to replace them. On top of all that, they will reduce your electric bill since they use only 20 to 30% as much energy as incandescent bulbs for the same amount of light.

Current technology has overcome many problems associated with fluorescent tubes. You can now get fluorescent tubes with excellent color, plenty of light, and no buzz or flicker. To take advantage of the benefits of fluorescent lighting:

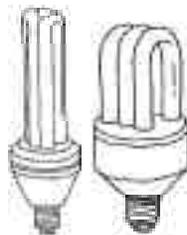
- Choose fixtures designed for fluorescent tubes.
- Request “T8 fluorescent tubes with an electronic ballast” when selecting fixtures that use the long fluorescent tubes (see What should I ask for to get good fluorescent lighting?).
- Use compact fluorescent bulbs that have a screw-in base to replace conventional incandescent light bulbs in your existing fixtures. Select a compact fluorescent bulb that is about 1/3 the wattage of your current incandescent bulb being replaced. Use compact fluorescent bulbs only where they fit completely within the fixture (see What should I ask for to get good fluorescent lighting?).
- Select frosted, not clear, incandescent bulbs.
- Consider using floor and table lamps designed for metal halide bulbs where you want a lot of light, such as beside your reading chair. Metal halide bulbs take several minutes to come up to brightness, but you will be rewarded with a lot of light, good color, and low electricity demand.



a.



b.



c.

Select fixtures designed to use what is termed “pin base” fluorescent bulbs (a). The ENERGY STAR label (b) on light fixtures helps you identify these fixtures. Screwbase compact fluorescent bulbs (c) can often replace traditional light bulbs for general lighting.

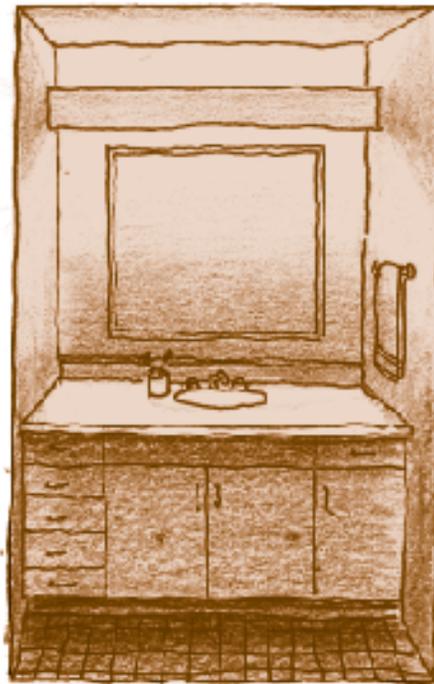
### What should I ask for to get good fluorescent lighting?

- For flicker-free, quiet operation, ask for a fixture or a compact fluorescent bulb with **electronic ballast**.
- For good color, ask for a bulb or tube with a correlated color temperature or **CCT of 2700 to 3500 K** and with a color rendering index or **CRI of at least 80**. These bulbs are sometimes designated as “827, 830 and 835.”
- Look for fixtures or screwbase compact fluorescent bulbs with the ENERGY STAR label.

## How can I see myself better in the mirror?

Good lighting will allow you to see yourself more easily in the mirror when grooming or dressing. You will have good color, non-glaring light, evenly distributed across your face if you:

- Place the fixtures on both sides of the mirror at about eye level to minimize shadows cast by your eyebrows, nose and chin. Alternatively, use a 4-foot (ft) fluorescent lighting fixture over the mirror so that some of the light reaches the sides of your face.
- Hide the direct view of the bulb while standing at the mirror by selecting fixtures with opaque fronts or shielding boards.
- Use bulbs with good color properties. Ask for CCT between 2700 and 3500 K and for CRI of 80 or above. These bulbs are sometimes designated as "827, 830 and 835."
- Choose countertop surfaces with light colors to reflect light to the underside of your chin. Use light color finishes on walls and ceiling.



Avoid fixtures located directly over your head. These fixtures make hard shadows on your face so it is difficult to apply makeup or to shave. A long fixture, with a fluorescent tube behind a shielding board, located over your mirror will bounce light off light-colored walls, ceiling, and counter. The bounced light will light your face more evenly and thereby help you to see your face well without shadows.

## How can I see my television or computer better?

It is difficult to see your television or computer when light from your fixtures or windows is reflected from the screen into your eyes. It is also uncomfortable when you have a direct view of a bright window or fixture. You can increase the visibility of the screen and your comfort by:

- Using shades or blinds on your window during the day.
- Select the location of the television or computer carefully. Sit in your normal viewing places with the television or computer off. If you can see an image of a window or a light fixture reflected in the screen, adjust your seating position, the location of the screen, or move the fixture.
- Avoid placing the screen in front of a window.
- Light the room with fixtures that spread a little light over large areas of the ceiling and walls. A floor lamp that throws light upwards is a good choice.



Select the location of the television carefully, and use fixtures that spread light over large areas of ceiling and walls.

## How can I avoid falling when I get up in the middle of the night?

When your eyes are adapted to the darkness, bright lights can be uncomfortable, but you still need to avoid objects in your path, see light switches, and perhaps find things. You have several ways to improve your comfort, safety, and ability to see at night:

- Keep a flashlight near your bed.
- Use nightlights. Select a fixture to leave on all night near your bedroom that provides low light levels.
- Mark the path between the bed and bathroom with one or more plug-in nightlights. These are commonly available with a photosensor that turns the light on automatically at night.
- Install light switches with toggles that glow in the dark. Place switches where you can reach them easily from your bed.
- Use a motion sensor in your hallway to the bathroom to turn on a low-brightness fixture automatically.



Plug in nightlights can help you find your way safely at night. You can find light switches in the dark if they have illuminated toggles.

## How can I see better while approaching my front door at night?

You want to be able to see the steps and railing and be able to insert your key into the lock quickly. You will be able to see better around your front door if you:

- Use contrasting colors to help you see steps and railing. If your stair treads are dark, paint the vertical portion of the stair a light color; if your wall is dark, paint the railing a light color.
- Shield your view of a bare bulb as you approach the door by selecting porch lights with opaque surfaces on the outward-facing surface. Be sure, however, that enough light is bounced forward so that you will be able to identify callers to your door from inside the house. Light-colored doors and walls will help bounce light forward.
- Place your porch lights on both sides of the door. If you have just one light, locate it on the keyhole side of the door. A porch light with an opening on the bottom will direct light downward so you can find the lock more easily.
- Aim your floodlights so they don't shine in your eyes as you approach or leave your home.



Be sure your fixture directs light to the doorknob, not directly to your face as you walk up the stairs.

## Lighting Rooms

There are many ways to light the rooms in your home. Here are a few examples of good lighting for older adults. Each section describes the lighting goals and principles for a room, illustrates a lighting solution, and summarizes how you can apply the solution.

### Living Room

A variety of activities occur in a living room. General lighting is necessary to allow people to see faces, engage in a conversation, and watch television. Task lighting should be available for reading or sewing, and accent lighting can be used to highlight artwork, plants, or any other interesting features. Lights aimed toward the walls and ceilings can also make the room appear brighter than if light is directed only to the floor. Bare bulbs should be hidden behind shades, architectural features, or opaque surfaces of fixtures.

Design features:

- Two 4-ft long wall-mounted strip lights, each with two fluorescent tubes, mounted behind a wall valance located at least 18 inches (in.) below the ceiling, light the wall and ceiling. The bulbs are 32-watt (W) T8/830 linear fluorescent tubes (CCT of 3000K and CRI of 80) with electronic ballasts.
- Plug-in table and floor lamps to light the reading chairs. The bottom of the floor lamp's shade is located at eye level when seated to minimize glare. Floor lamps should be located behind and slightly to the side of the reader. These lamps use 25- to 30-W ENERGY STAR labeled screwbase compact fluorescent bulbs or 75- to 100-W halogen incandescent bulbs. Table and floor lamps designed for 68-W metal halide bulbs can also be used. These metal halide bulbs provide a lot of light, but take several minutes to reach full brightness.

- Adjustable downlights, recessed in the ceiling, highlight objects on the wall, and provide brightness to the space. They are installed 1 to 2 ft from the wall and aimed at the paintings and hearth. These downlights have grooved baffles, and use 50-W Parabolic Aluminized Reflector (PAR) 20 or PAR 30 halogen floodlights.



### Lighting Tips

- Increase light level by placing fixtures close to your task, or by selecting light bulbs with more lumens (look for lumens rating on the package).
- Use light color finishes on walls and ceilings to soften the effects of bright light sources, and to reduce shadows.

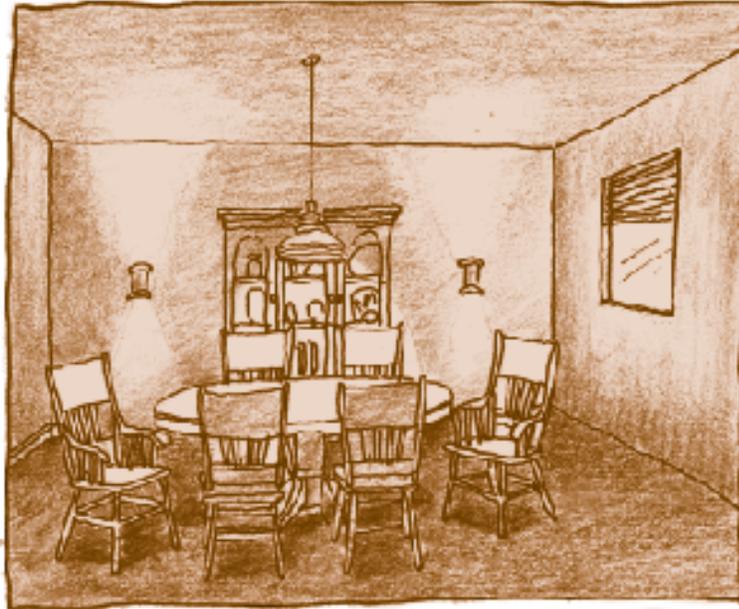
## Dining Room

Good lighting in dining rooms helps people clearly see the food on the table and each other's faces with minimum glare. A dimmer adjusts the light level, allowing low levels for candlelight dinners and high levels for paperwork on the dining table. Pendant fixtures light the table and provide general illumination. Chandeliers can also be used as general illumination and as a decorative complement of the décor, although they can be a source of glare if the wattage is too high and they cannot be dimmed. Accent lighting for artwork or any other interesting architectural features can add interest to the space.

Design features:

- A pendant fixture lights both the ceiling and the table. The bowl of the pendant luminaire is translucent to minimize glare. This pendant fixture uses two 75-W halogen incandescent bulbs. Alternatively, two 23-W ENERGY STAR labeled compact fluorescent bulbs can be used if the pendant is not controlled by a dimmer. If controlled by a dimmer, look for dimmable compact fluorescent bulbs. Make sure you do not see the bare bulb when seated.
- Wall sconces are mounted 6 ft above the floor on each side of the buffet or sideboard. The translucent fixture shields your view of the bulb and provides some brightness on the walls and ceiling. Each is designed to use an 18-W compact fluorescent bulb with electronic ballast.
- Although not shown in the figure, displayed objects can be accented with a narrow beam of light from adjustable recessed downlights installed in the ceiling above. Accent lighting can be achieved with adjustable recessed downlights with a 5 in. aperture. Use grooved baffle trim to avoid glare. Ask for 50-W PAR 20 or PAR 30 halogen floodlights or narrow floodlights if a narrower beam of light is desired.

- Dimming controls will enable you to vary the light for each occasion. The dimmer is located in the light switch and dims the halogen incandescent bulbs (or dimmable compact fluorescent bulbs) in the pendant over the table. Fluorescent tubes should not be put on a dimmer unless it is a dimming system specifically made for fluorescent bulbs. Look for information on the box.



### Lighting Tips

- Avoid using clear glass light fixtures.
- When using extra light on objects of special interest, such as pictures, vases, etc., aim the lighting at the object, not at your face.

## Kitchen

The kitchen should appear bright without glare. Good lighting is needed for a variety of visual tasks, including working at the sink and stove, preparing food, and reading recipes. Work areas on countertops should have extra light without shadows.

Design features:

- Fluorescent strip lighting fixtures are mounted on top of the cabinets since there is at least 12 to 18 in. of space from the top of the upper cabinets to the light-colored ceiling. These fixtures provide glare-free general lighting by bouncing light off the ceiling. Each fixture uses a 32-W/830 T8 fluorescent tube (CCT of 3000K and CRI of 80) with electronic ballast. For kitchens without an open cove above the cabinets, a ceiling-mounted, ENERGY STAR labeled fixture can be centered in the room. This alternate fixture features a frame and white acrylic diffuser, and also uses two 32-W/830 T8 fluorescent tubes with electronic ballast. Additional light over the sink and countertops should be used to avoid shadows.
- Undercabinet fluorescent lighting fixtures, hidden from view on the underside of the upper cabinets, light the countertops. These 2-ft long undercabinet fixtures have prismatic acrylic lenses and electronic ballasts, and use 17-W/830 T8 fluorescent tubes.
- A recessed downlight centered over the sink makes washing dishes and preparing food easier. This downlight has a white grooved baffle trim, 5 in. diameter aperture, and uses a 50-W PAR 30 incandescent halogen floodlight or narrow floodlight bulb.



## Lighting Tips

- Place light fixtures over the sink, stove, countertops, and other fixed work areas. Locate these fixtures to the side and slightly in front of the position where a person would usually stand to see the task.
- In the kitchen, avoid having only ceiling fixtures in the center of the room that cast your shadow when you are working at a counter or sink.

## Bathroom

Lighting in the bathroom should be bright, uniform and shadow-free, while minimizing glare. Good lighting is important for shaving, grooming, applying make up, climbing in and out showers, or reading fine print on prescription bottles. Faces lighted from all sides have few shadows. Skin tones and hair color appear better with light sources that offer good color rendering.

- A wall-mounted 4-ft long vanity light with opaque front, open top aperture, and acrylic lenses on the bottom aperture is mounted 6 1/2 ft above the floor and extends over the lavatory and toilet. The fixture bounces light off the ceiling, white countertop, and wall so all sides of the face are lighted at the mirror. People can also read easily while seated on the toilet. This valance fixture uses two 32-W/830 T8 fluorescent tubes with electronic ballasts. For smaller bathrooms, use a 2-ft long vanity light with two 17-W/830 T8 fluorescent tubes. An alternative to the valance is to use fixtures on each side of the mirror, when there is sufficient room.
- A wet-location-rated downlight recessed in the ceiling above the tub, using a 52-W halogen bulb, adds light to the shower area, and is switched separately from the valance light. When high light levels are uncomfortable in the middle of the night, the shower light alone is switched on, providing a more comfortable light level.



## Lighting Tips

- In the bathroom, use a shower light for good visibility.
- Choose non-shiny vanity countertop surfaces with light colors to reflect light to the underside of your chin.
- Light fixtures that are not wet-location-rated should be mounted at least 3 ft away from the bathtub or shower.

## Bedroom

Bedrooms need a low-level ambient light for a relaxing atmosphere, with some bright areas for reading or other activities. Reading lights should be flexible and glare free. At least one light should be able to be switched from the bed. A low-wattage nightlight plugged into an electrical outlet can improve safety when getting up at night.

Design features:

- A ceiling-mounted fixture with translucent acrylic diffuser provides uniform, shadow-free light when higher levels are desired throughout the bedroom. This fixture is a 22 in. diameter ENERGY STAR labeled fixture using two 24-W/830 long twin tube fluorescent tubes with electronic ballast.
- For lower, more relaxing ambient light, an ENERGY STAR-labeled torchiere stands on the floor, directing light to the ceiling. The torchiere uses three 36-W/830 compact fluorescent bulbs. Integral switches allow three levels of light: one, two, or three lamps. Alternatively, a portable swing-arm compact fluorescent floor lamp with 3-way socket, using a 39-W/830 3-level compact fluorescent bulb provides both ambient lighting and task lighting for a chair.
- Adjustable arm task lights mounted above the bed's headboard make reading in bed easier. They can be positioned to direct light onto reading materials without glare. Each task light uses one 18-W/830 compact fluorescent bulb and electronic ballast.



## Lighting Tips

- For added safety, keep a flashlight near your bed to guide you in the dark.
- Install light switches with toggles that glow in the dark. Place switches where you can reach them easily from your bed.

## Where to buy lighting equipment?

Light bulbs are commonly available in supermarkets, discount department stores, or hardware stores. They can also be purchased through electrical suppliers and lighting stores. Light fixtures can be purchased in discount department stores, hardware stores, or building supply stores. A greater variety of light fixtures can be found in lighting showrooms or through electrical suppliers. Lighting controls can be purchased at hardware stores, building supply stores, and discount department stores. In many cases, manufacturers do not sell the product directly to the consumer, but they will be able to help you find the best place to purchase their products. Below is a list of manufacturers to help customers get information and start their shopping. This is not a complete list of manufacturers, so check several sources before buying lighting equipment. This partial list of manufacturers in no way implies endorsement by the LRC and AARP Andrus Foundation.

<b>Fixture Manufacturers</b>	<b>Customer Services No.</b>	<b>Web Site</b>
Brownlee Lighting	800-318-6768	<a href="http://www.brownlee.com">www.brownlee.com</a>
Casella Lighting	415-626-9600	<a href="http://www.casellalighting.com">www.casellalighting.com</a>
Lightolier	508-679-8131	<a href="http://www.lightolier.com">www.lightolier.com</a>
Louis Poulsen	954-349-2525	<a href="http://www.louis-poulsen.com">www.louis-poulsen.com</a>
Microsun	800-657-0077	<a href="http://www.microsun.com">www.microsun.com</a>
Neo-ray Products	713-923-7781	
Progress Lighting	864-599-6000	<a href="http://www.progresslighting.com">www.progresslighting.com</a>
Sea Gull Lighting	800-347-5483	<a href="http://www.seagulllighting.com/">www.seagulllighting.com/</a>
Shaper Lighting	510-234-2370	<a href="http://www.shaperlighting.com">www.shaperlighting.com</a>
Task Lighting Corp.	800-445-6404	<a href="http://www.tasklighting.com">www.tasklighting.com</a>
Trend Lighting Company	800-325-9532	<a href="http://www.supertrendlighting.com">www.supertrendlighting.com</a>
Visa Lighting	414-354-6600	<a href="http://www.visalight.com">www.visalight.com</a>
Wila Lighting	714-546-8999	<a href="http://www.wila.de">www.wila.de</a>
Winona Lighting	800-328-5291	<a href="http://www.winonalighting.com">www.winonalighting.com</a>
Zumtobel Staff Lighting	800-448-4131	<a href="http://www.zumtobel.co.at">www.zumtobel.co.at</a>

## Light Bulb Manufacturers

GE Lighting	800-626-2000	<a href="http://www.gelighting.com">www.gelighting.com</a>
Lights of America, Inc.	800-321-8100	<a href="http://www.lightsofamerica.com">www.lightsofamerica.com</a>
OSRAM Sylvania	800-544-4828	<a href="http://www.sylvania.com">www.sylvania.com</a>
Panasonic Lighting	201-348-5381	<a href="http://www.panasonic.com/lighting">www.panasonic.com/lighting</a>
Philips Lighting	800-555-0050	<a href="http://www.lighting.philips.com">www.lighting.philips.com</a>
Venture Lighting International, Inc.	800-965-2677	<a href="http://www.hiddirect.com">www.hiddirect.com</a>

## Customer Services No.

## Web Site

## Lighting Controls Manufacturers

GE Lighting	800-626-2000	<a href="http://www.gelighting.com">www.gelighting.com</a>
Hubbell Lighting, Inc.	540-382-6111	<a href="http://www.hubbell-ltg.com">www.hubbell-ltg.com</a>
Lightolier Controls	972-840-1640	<a href="http://www.lolcontrols.com">www.lolcontrols.com</a>
Lutron Electronics Co.	800-523-9466	<a href="http://www.lutron.com">www.lutron.com</a>
Sensor Switch, Inc.	800-727-7483	<a href="http://www.sensorswitchinc.com">www.sensorswitchinc.com</a>
The Watt Stopper, Inc.	408-988-5331	<a href="http://www.wattstopper.com/webc/home.htm!">www.wattstopper.com/webc/home.htm!</a>

## Customer Services No.

## Web Site

## Further Information

One of the barriers to good lighting is that people who need good lighting do not know what to ask for! A glossary is provided at the LRC website at [www.lrc.rpi.edu](http://www.lrc.rpi.edu) and at the AARP Andrus Foundation website at [www.andrus.org](http://www.andrus.org) to make asking easier. Below are some useful references that will also provide you with more information on good lighting for older adults.

### Papers and articles

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## Websites

AARP Andrus Foundation - [www.andrus.org](http://www.andrus.org)

Lighting Research Center at Rensselaer Polytechnic Institute - [www.lrc.rpi.edu](http://www.lrc.rpi.edu)

ENERGY STAR Program - [www.energystar.gov](http://www.energystar.gov)

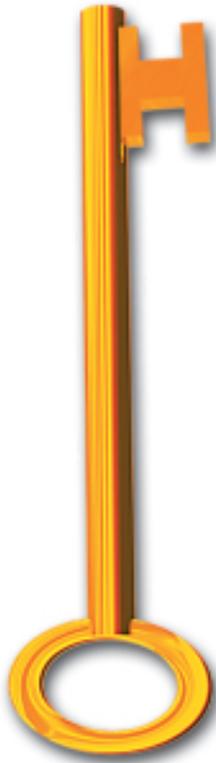
Lighthouse International - [www.lighthouse.org](http://www.lighthouse.org)

International Association of Lighting Designers - [www.iald.org](http://www.iald.org)

Illuminating Engineering Society of North America - [www.iesna.org](http://www.iesna.org)

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## Good lighting can be a key to independence!

Changing life style...this is a scary reality. No one looks forward to the time when performing simple tasks, such as reading the newspaper or putting together a jigsaw puzzle, becomes impossible. Even everyday tasks, such as cooking, cleaning, reading a prescription label, or choosing an outfit can become difficult or impossible to execute without good sight. Good lighting can help!

For many older adults, losing the ability to see well means losing independence. Light is essential to sight. Sight is essential to independence. Our ability to see, and therefore remain independent in later years, is compromised by bad lighting. And bad lighting surrounds us all, everyday. Lighting touches each of us every day, and it can be used to make a positive difference in our lives.