Lighting Your Way

Leader's Guide

Objectives:

1. Understand the basics of lighting in the home.
2. Learn what constitutes good lighting as we age.
3. Be able to select the kind of light needed for the many uses in and out of the home.
4. Understand the choices available in bulbs and light sources and the energy savings some will provide

Materials for participants:

- "Lighting Your Way to Better Vision" – brochure donated from *Center of Design for an Aging Society*. The lesson uses this brochure extensively for examples of lighting in the home.
- Participant handout including "Evaluate the Lighting in Your Home" handout/activity and "Estimated Cost to Household" (table) handout
- Consent letter/evaluation

Before the Lesson:

- Obtain participant brochures from Teresa Crowley, 161 Milam Hall, OSU, or download copies from http://www.centerofdesign.org/pdf/Aging_Eyes_booklet-single.pdf.
- Copy participant handout, evaluation and consent form.
- Purchase or borrow examples of lights, lighting fixtures and lighting gadgets that can make home safer (see text for suggestions.) Some stores will allow you to purchase and return items if you keep the receipt.
- To show color of light from Compact Fluorescent Light (CFL) bulbs: obtain a power strip, "outlet to socket" device, and CFL bulbs that show yellow light, soft white and daylight white.
- Optional materials to use (attached): "What to do when a fluorescent or other mercury-containing light bulb breaks"

Introduction

Day and night, lighting makes a big impact on our daily lives. In this lesson we will examine how lighting choices in our environment can make our lives safe and comfortable as well as save us money. We may need to retrofit what is already in our home, add new lighting to existing spaces, or plan and design new spaces in a house or apartment. These tasks will be easier when we know the choices that are available and can define what we need and want in these spaces.

Activity--discussion:

- Favorite light or lamp in your house (now or in the past)
- Most helpful, useful light in the house
- Most memorable light in the house, why?
  -- responses might be: fireplace . . . candlelight . . . flashlight under the covers . . . morning sun in kitchen window. . .special lamp for quilting.

Use these questions to get participants thinking about the use of light in their home.

Lighting in Our Environment, Saving Energy

The kind and amount of light in our surroundings affects how well we do our daily tasks, influences our mood, and will even impact our health. The kind and amount of light is also important to energy efficiency.

Lighting technologies developed in the past 10 years can help us cut lighting costs 30-60 percent and more while improving lighting quality and reducing environmental impacts. To save lighting energy you can lower wattage, reduce the light's on-time, use daylight, and perform simple maintenance tasks.

Plans for a room that recognize what tasks will occur in a given area - and sizing the lighting to that task - will maximize the energy dollars. Whether planning to cut energy costs or designing the lighting specifically for a given area, it is important to consider the quality of the light, which can affect its level of comfort. We will consider both energy savings and light quality in this lesson.

Lighting Basics or how we use Light in our Homes

Good lighting in the home will incorporate three basic categories of lighting—general or ambient lighting, task lighting and accent lighting. The use of all three will create layers of light to provide illumination, make tasks easier and highlight key design features in your home.

Go to participant brochure: "Lighting Your Way to Better Vision" –refer to pages 6 through15 to see examples of general or ambient lighting, task lighting and accent lighting. Notice how each is used in a variety of ways.

General lighting, also called ambient lighting, provides an area with overall illumination. It enables you to see and walk around safely by giving a comfortable level of brightness. Think of general lighting as a basic form of lighting to replace sunlight both indoors and outdoors. This is the first consideration when planning or improving the lighting in your home. It can be accomplished with:

- Chandeliers
- Ceiling fixtures
- Wall-mounted fixtures (i.e. sconces)
- Recessed or track lights
- Windows/skylights
- Lamps (i.e. torchiere lamp in living room without ceiling fixture)
- Lanterns (outside)

Task Lighting provides enough illumination that tasks can be completed accurately but not so much that entire areas are illuminated. It is focused lighting that help you perform specific tasks such as reading, cooking, shaving, applying makeup, doing homework, hobbies, or games or balancing your checkbook. It needs to be bright enough to prevent eyestrain yet free from glare and shadows. It can be accomplished with:

- Recessed or track lights
- Under counter lighting

- Pendant lighting
- Portable lamps
- Night lights
- Solar lights on walkways
- Emergency lighting

Accent Lighting adds drama or visual interest and can highlight design features in the home. It is used to spotlight paintings, houseplants, textures, landscaping features, or other special items. You need three times as much light on the focal point as the general lighting around it. This is usually provided by using track, recessed, or wall mounted fixtures. Sometimes we use fire in a fireplace or candles as accents.

Layers of Lighting – there is no perfect lighting. The light you will use to peel potatoes won't be the right light for a romantic dinner just as the light you use for reading a book probably won't be the right one for watching movies on a large television screen. Look at the activities that are taking place in a room and plan layers of light using general, accent, and task lighting. Give the lighting in your home as much flexibility as possible.

Look at the kitchen. Overhead lighting is important to make the day to day, in and out activities possible. In the middle layer, task lighting will highlight work areas with under cabinet or other types of lighting. A bottom layer of accent lighting adds sparkle to china cabinets or for highlight special features.

See top photo on page 9 of participant brochure.

Using all three creates flexibility to create just the right atmosphere and gives you a comfortable and pleasant space to enjoy. Pay attention to the light switches to be sure multiple environments can be created. A dimmer switch on the right light gives you an even wider range of possibilities.

Types of Lighting Available

Show participants examples of lights (incandescent, CFL, and LED). Show differences in the color of CFL's available by setting up bulbs on a power strip (see "before the lesson"). Pass examples around or light them as they are discussed.

Besides natural light, there are several types of lighting available for our homes today such as incandescent, florescent and light emitting diodes (LED). The technology is rapidly changing and can help us choose the best light for our surroundings. But first let's look at the cheapest and best light—natural light.

Natural Light

Daylight in our home is very important. As we get older, less light actually gets to the retina in our eyes to stimulate the nerves, so more light without glare is required. The intensity of daylight is much greater than typical electric lights and daylight includes the full color spectrum. Of course, daylight is free—a good reason to include daylight in your home.

Geographic location will affect the kind of light we need in our homes or work. In Oregon we have areas of our state that have sunlight almost every week of the year and other areas that have no sun for months at a time. This will influence how much additional light we will want to have in our home during daylight hours. The direction our house or apartment is situated will affect the kind and amount of daylight we receive as well. Light is different during the seasons from the north, south, east and west which may make a difference in what is desired.

Lighting can improve your general health

In addition to providing light for vision, the photobiological effects of light are very important for the health of older people.

- Sunlight on the skin produces vitamin D, which is required for calcium to be absorbed to keep bones strong. A 1995 study of older persons living at home found that 54% had low vitamin D levels.

  Food and supplemental sources of vitamin D may be required to have an adequate level in the body. Ask your physician for recommendations.

- Daylight seen through eyes keeps our body clock (circadian rhythm) synchronized with the day/night cycle of light. Circadian rhythm disruption impacts both sleep at night and alertness during the day. A high percentage of older people experience sleep disorders due in part to lack of daylight.

Go to “Lighting Your Way to Better Vision” for more on natural light, page 5 and 6. To see more examples of the use of natural light, see pages 7, 8, 13, and 15.

Incandescent

Incandescent is the least expensive to buy and the most expensive to operate. It has the shortest life span of the common lighting types and is relatively inefficient compared with other lighting types. The most common types of incandescent lights are standard incandescent and tungsten halogen.

Here are some points to remember when considering incandescent usage:

- Larger wattage bulbs may not be the most energy-or cost-effective option, depending on how much light is needed.
- Excessive wattage creates unnecessarily high illumination.
- Incandescent bulbs generate a lot of heat and can overheat fixtures. This is why you don’t want to put bulbs in sockets that exceed the recommended wattage.
- New reduced wattage lamps use approximately 15% less power.
- The right incandescent lamp should be selected for the job.
- New incandescent fixtures are designed to force all their light out into the room. Reflector (R) lamps and ellipsoidal reflector (ER) lamps are two examples of new fixtures. The ER lamps outperform R lamps because of how the light is reflected out of the lamp. These are often used in recessed fixtures.
- Although long-life bulbs last longer than their regular counterparts, they are normally less energy efficient.

- Replacing incandescent lamps with compact fluorescent lamps provides energy savings of 60% to 75%.
- Tungsten halogen bulbs use about 60% less power than standard incandescent and provide longer service. They are considerably more expensive than standard incandescent. Care should be taken where these are used as they get very hot.

Fluorescent

Fluorescent is an energy efficient lighting choice because it is about four times as efficient as incandescent lighting. They are not all energy efficient, so shop carefully. Look for the ENERGY STAR® logo. The technology is changing extremely rapidly –you can get fluorescent bulbs to replace almost any incandescent or halogen bulb you have in your home. The selection is mind-boggling!

- Fluorescent lighting is used for both ambient and task lighting because the low brightness creates less direct glare than do incandescent bulbs.
- They normally last about 10 times longer than incandescent.
- Install fluorescent lighting in places where they will be on for several hours at a time.

The following points will help in selecting the best fluorescent light bulbs:

- Select lights with a mid range temperature 3500-5000K. This will be the preferable light for a residence.
- Select the longest rated life.
- The efficiency of lights is measured by the amount of lumens created per watt of electricity expended. For example, fluorescent lights may range from 22-85 lumens per watt.
- Compact fluorescent lights (or lamps) (CFLs) combine the efficiency of fluorescent lighting with the convenience and popularity of incandescent fixtures and save up to 75% of the initial lighting energy.
- The Color Rendering Index (CRI) is often the only information available for compact fluorescent lighting. A CRI of 100 is closest to sunlight. Bulbs can be found with yellow light, soft white and daylight white.

Show the examples of colors of bulbs. Which color of light to you prefer? Why? Which color would you choose to use for certain rooms, areas or tasks?

Contrary to popular belief, turning off fluorescent lights really does save energy. Frequent switching may shorten bulb life, but electric bill savings will more than compensate for the shorter lifespan, especially if you end up using more CFLs than incandescent. ENERGY STAR® recommends using fluorescent bulbs in fixtures that you tend to use for at least 15 minutes at a time or several hours a day for the most savings.

Refer to "Estimated Cost to Household" in participant handout. Look at the cost comparisons between incandescent and fluorescent lighting. Discuss the cost savings that a household can have by making changes in the kinds of light used in the home.

Optional: Clean up and waste disposal of fluorescent bulbs: see accompanying handout. The average CFL bulb contains between 4 and 5 milligrams of mercury, about as much as the ink on a ballpoint pen tip. (Old mercury thermometers contained about 500 milligrams of mercury.) Because mercury is toxic, be careful how and where you use the bulbs, especially in table lamps where children play.

LED (Light Emitting Diode)

LED lights are very small, extremely durable, and have the potential to be more energy efficient and last far longer than most current lighting technologies. They are considered environmentally friendly, produce very little heat and their lifetimes are not affected by frequent on/off switching. While LEDs remain more expensive than other lighting, the price of this lighting has plummeted in the past several years.

LEDs are a part of a comparatively new class of lighting called Solid State Lighting. They are small electronic components that convert electricity into light. Applications already being used are: flashlights, decorative lighting strings (Christmas tree lights), auto headlamps, status lights on electronic devices of all kinds (cell phones), traffic lights, retail display lighting, desk and task lights, down-lights, and under-cabinet lights. These lights give a very direct, focused light.

LEDs for general illumination currently may be considered "Not Quite Ready for Prime Time" but they are improving very rapidly. They are already available for multiple applications in and around the home—from landscape and walkway lighting to holiday lighting, and event in ambient lighting in hard to reach places where the long life of LEDs is a real asset.

Tips for Lighting as We Age

Adequate light in an older person's home is necessary to maintain safety, to allow them to fully participate in hobbies and activities and can elevate their mood. As people age, they require more light to safely navigate stairs and uneven surfaces, to read, to see the details of a project they are working on.

Refer to participant brochure on pages 3 and 4. Discuss lighting on the outside of the home that is important for safety. Show some of the gadgets mentioned here.

Refer participants to their handout for more tips.

Summary

Go to pages 16 and 17 in the brochure. Look at some simple suggestions that can make a difference in the lighting in your home. Assess your home environment by asking the questions on page 17.

Encourage participants to take the handout, "Evaluate the lighting in your home" home and analyze the lighting during the day and night. This may help in prioritizing and making decisions about changes that could made in their home.

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

Evaluation

Please take time to evaluate the program by reading the consent form and filling out the evaluation survey. Please return it to your extension faculty member.

Notes:

A good source of information that you may wish to preview before teaching the lesson can be found at the U. S. Department of Energy website: www.energysavers.gov select: Your Home, then Lighting and Daylighting

For more ideas on lighting options for the various spaces, rooms or regions in the house, go to this website: www.sylvania.com/Lighting101/LightingIdeas/HomeLightingIdeas/default.htm

To learn more about lighting in the home, go to these websites:
Center of Design for an Aging Society, website: www.centerofdesign.org (go to lighting)
www.kichler.com/consumer Go to "learn about lighting"

References:

"Lighting with Energy Efficiency in Mind" P2269, MSUcares, Mississippi State University Extension Service. http://msucares.com/pubs/publications/p2269.html

"Energy Efficient Homes: Fluorescent Lighting" FCS3270, University of Florida, IFAS Extension http://edis.ifas.ufl.edu/fy1031

"Energy Efficient Homes: Introduction to LED Lighting" FCS3280, University of Florida, IFAS Extension http://edis.ifas.ufl.edu/document_fy1049

"See the Light", Cooking Light, January/February, 2009

"Lighting, New twists in savings", Consumer Reports, October 2007

"Compact Fluorescent Bulbs", Consumer Reports, October 2008

Lesson written by: Janice Gregg, Extension Faculty, Family and Community Health
Linn and Benton Counties

Lesson reviewed by: Jeanne Brandt, Extension Faculty, Family and Community Health
Washington County

Oregon State University Extension Service

© 2009 Oregon State University. OSU Extension Service cooperating. OSU Extension Service offers educational programs, activities, and materials without discrimination based on race, color, religion, sex, sexual orientation, national origin, age, marital status, disability, or disabled veteran or Vietnam-era veteran status. OSU Extension Service is an Equal Opportunity Employer.

What to Do when a Fluorescent or Other Mercury-Containing Light Bulb Breaks

Compact fluorescent lights (CFLs) are lighting more homes than ever before, and EPA is encouraging Americans to use and recycle them safely. Carefully recycling CFLs prevents the release of mercury into the environment and allows for the reuse of glass, metals and other materials that make up fluorescent lights.

In Oregon, Home Depot is the only home improvement store that accepts CFLs for recycling. The bins are located at the entrance of the store by the returns desk. They do not accept fluorescent tubes. Check with your waste disposal company to see how they want you to dispose of fluorescent light bulbs.

Bulbs that contain mercury are:

- Fluorescent bulbs, which include linear, U-tube and circline fluorescent tubes, bug zappers, tanning bulbs, black lights, germicidal bulbs, high output bulbs, cold-cathode fluorescent bulbs, and compact fluorescent bulbs;
- High intensity discharge bulbs, which include metal halide, ceramic metal halide, high pressure sodium, and mercury vapor;
- Mercury short-arc bulbs; and
- Neon bulbs.

Fluorescent light bulbs contain a very small amount of mercury sealed within the glass tubing. EPA recommends the following clean-up and disposal if a bulbs breaks.

Before Clean-up:

- Air Out the Room
- Have people and pets leave the room, and don't let anyone walk through the breakage area on their way out.
- Open a window and leave the room for 15 minutes or more.
- Shut off the central forced-air heating/air conditioning system, if you have one.

Clean-Up Steps for Hard Surfaces

- Carefully scoop up glass pieces and powder using stiff paper or cardboard and place them in a glass jar with metal lid or in a sealed plastic bag.
- Use sticky tape, such as duct tape, to pick up any remaining small glass fragments and powder.
- Wipe the area clean with damp paper towels or disposable wet wipes. Place towels in the glass jar or plastic bag.
- Do not use a vacuum or broom to clean up the broken bulb on hard surfaces.

Clean-up Steps for Carpeting or Rug

- Carefully pick up glass fragments and place them in a glass jar with metal lid or in a sealed plastic bag.

- Use sticky tape, such as duct tape, to pick up any remaining small glass fragments and powder.
- If vacuuming is needed after all visible materials are removed, vacuum the area where the bulb was broken.
- Remove the vacuum bag (or empty and wipe the canister), and put the bag or vacuum debris in a sealed plastic bag.

Clean-up Steps for Clothing, Bedding and Other Soft Materials

- If clothing or bedding materials come in direct contact with broken glass or mercury-containing powder from inside the bulb that may stick to the fabric, the clothing or bedding should be thrown away. Do not wash such clothing or bedding because mercury fragments in the clothing may contaminate the machine and/or pollute sewage.
- You can, however, wash clothing or other materials that have been exposed to the mercury vapor from a broken CFL, such as the clothing you are wearing when you cleaned up the broken CFL, as long as that clothing has not come into direct contact with the materials from the broken bulb.
- If shoes come into direct contact with broken glass or mercury-containing powder from the bulb, wipe them off with damp paper towels or disposable wet wipes. Place the towels or wipes in a glass jar or plastic bag for disposal.

Disposal of Clean-up Materials

- Immediately place all clean-up materials outdoors in a trash container or protected area for the next normal trash pickup.
- Wash your hands after disposing of the jars or plastic bags containing clean-up materials.
- Check with your local sanitation company about disposal requirements in your specific area. Some states do not allow such trash disposal. Instead, they require that broken and unbroken mercury-containing bulbs be taken to a local recycling center.

Future Cleaning of Carpeting or Rug: Air Out the Room During and After Vacuuming

- The next several times you vacuum, shut off the central forced-air heating/air conditioning system and open a window before vacuuming.
- Keep the central heating/air conditioning system shut off and the window open for at least 15 minutes after vacuuming is completed.

From: www.epa.gov/mercury

Oregon State University Extension Service

© 2009 Oregon State University. OSU Extension Service cooperating. OSU Extension Service offers educational programs, activities, and materials without discrimination based on race, color, religion, sex, sexual orientation, national origin, age, marital status, disability, or disabled veteran or Vietnam-era veteran status. OSU Extension Service is an Equal Opportunity Employer.