Practical Lighting Design

If you'd like to get up to speed on interior lighting but haven't found the time, *The Lighting Pattern Book for Homes*, by Russell Leslie and Kathryn Conway, is a good place to start. It lays out this complex subject in clear, systematic form, with chapters on lighting techniques, design, economics, lamps, luminaires, and controls.

The heart of the book is 75 pages of sample room designs, with suggested lighting "patterns," a few of which are featured here. Based on extensive review of plans and actual homes, these designs represent the main spaces commonly found in homes: living room, dining room, kitchen, bathroom, bedroom, office, entry, stairway, and hall. For each room, small, medium, and large designs are presented in 3-D rendering and plan view. The inclusion of furnishings in the designs lends scale and realism to the rooms.

In each case, the "typical" scenario is presented first, the kind of lighting one sees in homes everywhere — mainly standard incandescent, with some fluorescent in the kitchen. The authors then suggest changes that can be made to improve the quality and the efficiency of the lighting. The changes are presented incrementally, from replacing the lamps or the luminaires (lighting lingo for "bulbs" and "fixtures") to a complete remodel (also applicable to new construction), where an entirely different lighting arrangement is suggested. For each set of room designs, the economic effects of the suggested changes are presented in a bar chart.

By studying the suggested revisions to the typical designs, you will get a feel for the way one type of lamp or luminaire can be substituted for another. This is particularly useful if, like most builders, you're not clear on the differences in quality and output of the various new halogen and fluorescent lamps that are out there. It's all too easy to think in terms of old familiar incandescents — the Edison bulb and R-lamps — and miss out on the substantial energy savings offered by the newer technologies. The authors' primary purpose in writing the book was to encourage the use of efficient lighting. For the most part, this means opting for fluorescent lamps, which have a higher *efficacy* (produce more lumens per watt) than incandescents. The authors are aware of the common negative reactions to fluorescents ("they make things look funny") and are careful to recommend the more expensive fluorescents made with rare earth phosphors, which render color much better than the "cool white" tubes that most of us associate with fluorescents.

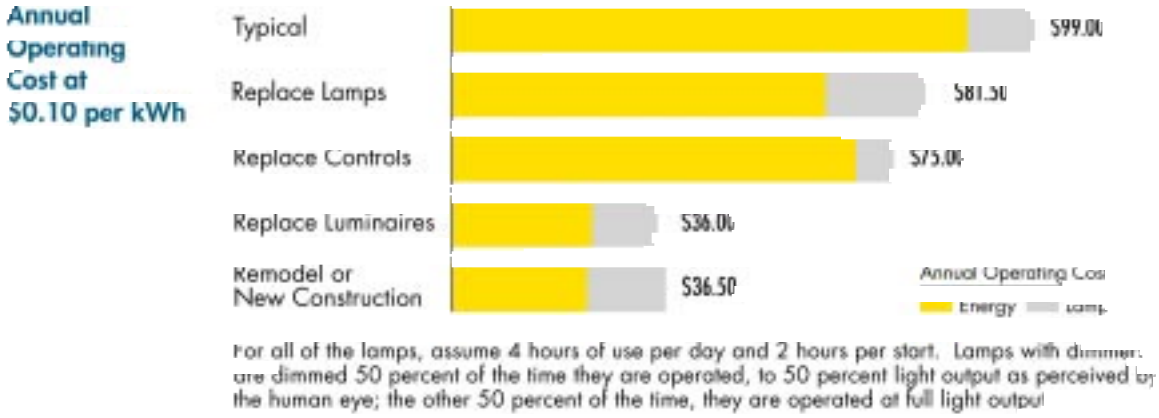
The chapter on lamps is particularly helpful for sorting through the many available options. It's hard to choose between the different types of incandescent reflectors or compact fluorescents while staring at the huge display in the local home center. But the charts in this book make it easy to compare wattage, light output, color rendering, lamp life, cost, and more across the spectrum of available lamps.

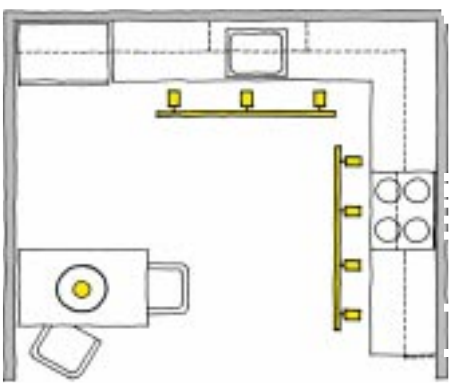
The chapter on luminaires provides descriptions of lighting fixtures from chandeliers to night-lights. The section on recessed lights has an excellent glossary of parts, and clears up the distinctions between downlight, wall-wash, and accent cans. The architectural lighting section explains the differences between coves, soffits, and valances.

Even if your clients don't want fluorescent lights in every room, *The Lighting Pattern Book for Homes* is the best reference we've seen for integrating room lighting design with fixture and lamp selection. Originally available in a ring-bound format, the book has been recently republished by McGraw-Hill in hardback. The 221-page book costs $60. You can order it directly from the Lighting Research Center (877 25th St., Watervliet, NY 12189; 518/276-8716).

Kitchens

Give special consideration to lighting counters, as this is the primary task area in kitchens. Where possible, locate the sink in front of a window for good use of daylighting. Locate luminaires near the areas of greatest use and on both sides of the primary work areas to control glare. Install downlights over the counter 1 to 2 feet from the wall, but avoid locating them over the upper wall cabinets. To minimize shadows, avoid locating the lamp behind the person using the counter. Use under-cabinet luminaires to avoid shadows under overhead cabinets.





Typical

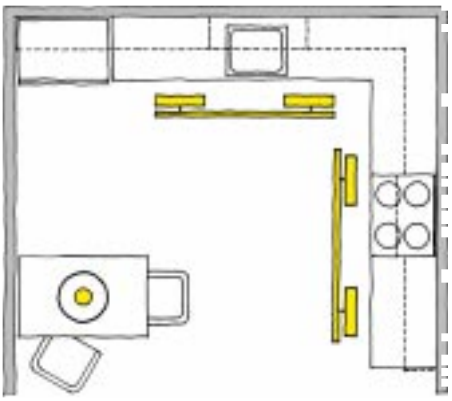
Seven ceiling-mounted track heads and one suspended downlight, each containing one 75-watt incandescent A-lamp, provide ambient lighting and lighting for the counters. Two wall-mounted switches control the two types of luminaires.

Replace lamps

If lower light output is acceptable, replace the A-lamps in the track heads with 60-watt halogen A-lamps. Optionally, for track heads that are designed for R-lamps, replace the lamps with 50-watt halogen PAR-lamps. Replace the A-lamp in the suspended downlight with one electronically ballasted 18-watt globe screwbase compact fluorescent lamp if a slightly lower light output is acceptable and any existing diffuser can be removed.

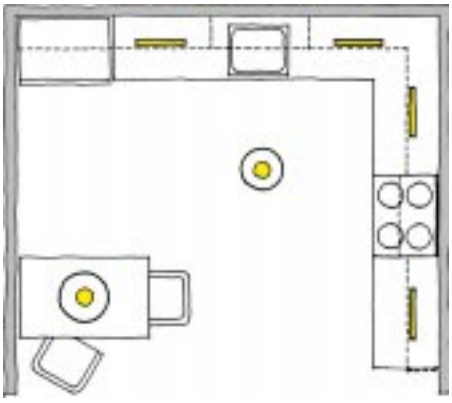
Replace controls

For the typical design, replace the switch for the track heads with a dimmer or, optionally, with a motion detector.



Replace luminaires

Without altering the layout of the tracks, replace the existing seven track heads with four track heads, each containing one 39-watt, 16.5-inch fluorescent twin-tube lamp and one electronic ballast. Replace the A-lamp in the suspended downlight with one electronically ballasted 18-watt globe screwbase compact fluorescent lamp if a lower light output is acceptable and any existing diffuser can be removed. Control both types of luminaires with wall-mounted switches.



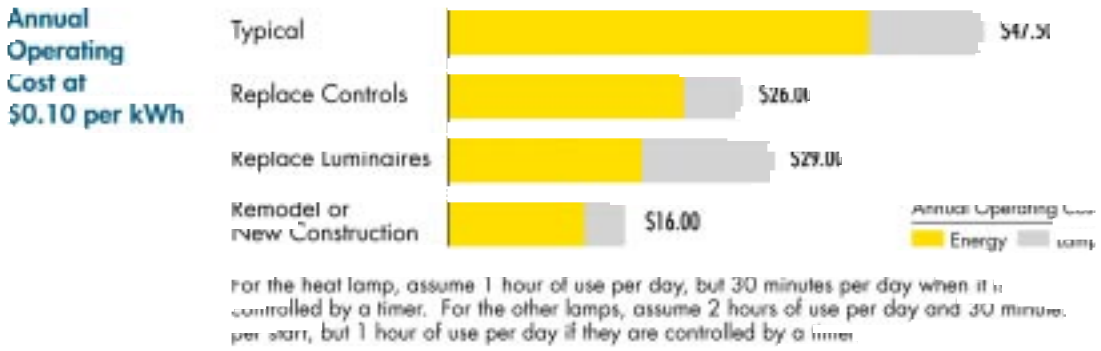
Remodel or new construction

This design offers a different light distribution pattern, especially on the counters where light is provided by four under-cabinet luminaires, each containing one 13-watt, 21-inch warm white T5 linear fluorescent lamp and one magnetic ballast. One ceiling-mounted diffuser and one suspended downlight, each containing three 13-watt compact fluorescent twin-tube lamps and one magnetic ballast, provide ambient lighting.

The ceiling-mounted luminaires are controlled by a wall-mounted switch and the T5 lamps are controlled by one manual switch or optionally by switches mounted on each luminaire.

Bathrooms

An important visual task in a bathroom is viewing oneself in the mirror. Direct the light to the person, not to the mirror. Use light from both sides of the mirror to reduce shadows on the face. If a single luminaire is used above the mirror, use one that is at least 2 feet long to avoid casting shadows under the chin; avoid reflector lamps because they may cast harsh shadows. Use a light-colored countertop to reflect light under the chin. Also avoid locating the lamp behind the persons viewing the mirror, to prevent their faces from being in a shadow. Use rare-earth fluorescent lamps for bathroom mirrors to provide good color.



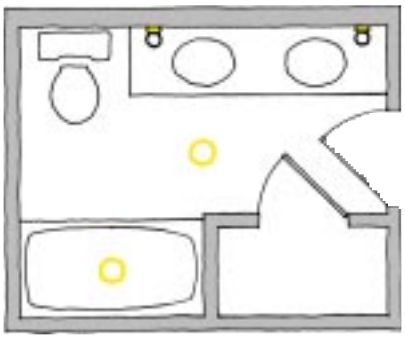
For the heat lamp, assume 1 hour of use per day, but 30 minutes per day when it is controlled by a timer. For the other lamps, assume 2 hours of use per day and 30 minutes per start, but 1 hour of use per day if they are controlled by a timer.

Typical

Two wall-mounted vanity lights, each containing four 40-watt G25 incandescent lamps, provide ambient lighting and lighting for the mirror. One recessed downlight (enclosed with a lens) containing one 60-watt incandescent A-lamp provides lighting in the shower. Another recessed downlight contains one 250-watt R40 heat lamp.

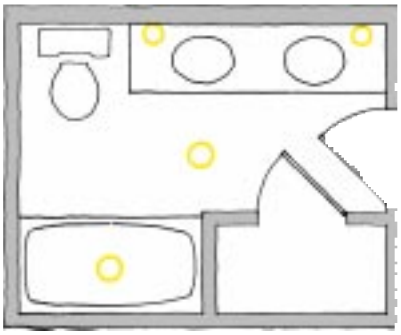
Replace controls

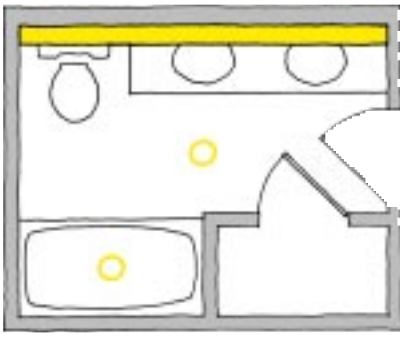
Replace the wall-mounted switches for the vanity lights and the heat lamp with interval timers.



Replace luminaires

Two wall-mounted vanity lights, each containing two 18-watt, 10.5-inch long twin-tube fluorescent lamps and one magnetic ballast, provide ambient lighting and lighting for the mirror. One recessed downlight, containing two 13-watt compact fluorescent twin-tube lamps and one magnetic ballast, provides lighting in the shower. This design retains the recessed downlight that contains one 250-watt R40 heat lamp. Each type of luminaire is controlled by a separate wall-mounted switch.





Remodel or new construction

Install a soffit containing two 40-watt, 5-foot T8 RE730 linear fluorescent lamps and one electronic ballast to provide ambient lighting. For lighting in the shower, install one recessed downlight (enclosed with a lens) containing two 13-watt compact fluorescent twin-tube lamps and one magnetic ballast. This design also retains the recessed downlight with a 250-watt R40 heat lamp, but the downlight is controlled by an interval timer. The other luminaires are controlled separately by wall-mounted switches.

Living Rooms

The living room designs support many activities, including conversation, reading, and television viewing. Locate luminaires near places where reading or other visually demanding tasks will be done. Use table or floor lamps, which can be relocated as the furniture arrangement changes. For watching television, use low-level ambient lighting.

Locate the television so that the images of light sources, including windows, are not reflected from the television screen into the eyes of the viewer. For greater viewing comfort, avoid windows or bright lamps and luminaires on the wall directly behind the television. Switch lamps separately in a living room with a television, or use dimmers to reduce ambient light when there are no other simultaneous visual tasks such as reading.

Living rooms may also have artwork on the walls. Avoid direct sunlight on paintings, prints, and drawings to reduce fading. To highlight artwork, use accent lighting or wall washing techniques. Position the lamp to avoid reflected glare, especially for shiny surfaces or glass-covered artworks. Locate low-wattage lamps close to the artwork to save energy while maintaining illumination; however, do not locate them so close that they would discolor or burn the artwork. To reveal texture and form on sculptures, try lighting one side of the form more than the other to create shadows. Switch the artwork luminaires separately to avoid long exposure to light on sensitive artwork.

Plants have special lighting requirements that can be met economically and efficiently in the home. A simple system of linear fluorescent lamps, positionable luminaires, and a timer can be integrated into shelving, display cabinets, or free-standing benches. Consult a lamp catalog or a garden center for guidance on lamp selection.

Typical

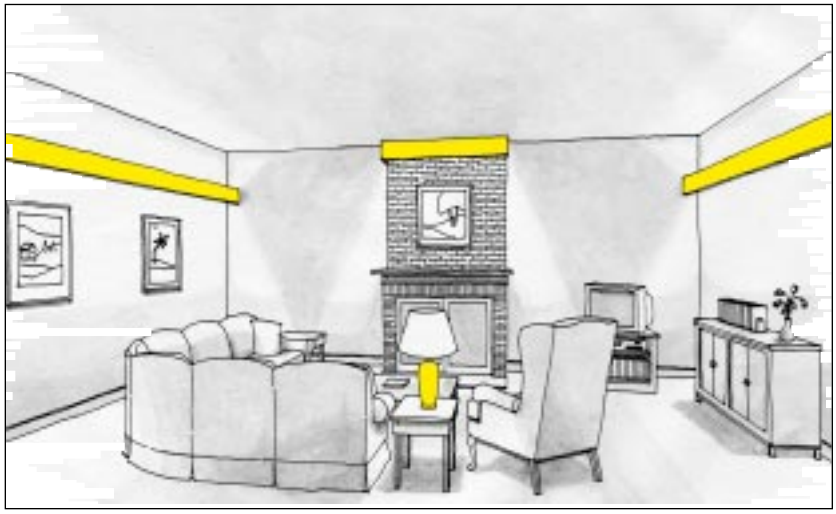
Four recessed downlights, each containing one 75-watt R30 lamp, provide ambient lighting. Two table lamps, each containing two 60-watt A-lamps, provide lighting for reading. A recessed accent luminaire containing a 75-watt R30 lamp highlights the fireplace and is controlled by a separate wall-mounted switch.

Replace lamps

Replace the five R30 lamps with five 50-watt PAR30 halogen flood lamps and the four 60-watt lamps with 52-watt halogen A-lamps. Alternatively, replace the four 60-watt lamps with four electronically ballasted 18-watt screwbase compact fluorescent twin-tube lamps, if they fit in the luminaires.

Replace controls

For the typical design, replace the wall-mounted switch for the four recessed downlights with a motion detector. Optionally, install dimmers for the table lamps but do not use dimmers with compact fluorescent lamps.



Remodel or new construction

For a different light distribution pattern in the living room, two valances and one soffit, containing a total of seven electronically ballasted 40-watt, 5-foot T8 linear fluorescent RE830 lamps, provide ambient lighting. Depending upon the dimensions of the room, 4-foot lamps could also be used in these architectural luminaires. The table lamp contains two 13-watt compact fluorescent twin-tube lamps and one magnetic ballast. The valances and soffit are each controlled by a wall-mounted switch.