Lighting Safety

Presented by The Salus University Occupational Therapy Program

Why Does Lighting Matter?

1. Adequate lighting is important to improve quality of life and decrease risk for falls
   - Falls threaten safety and independence and generate enormous economic and personal costs (1 in 3 seniors over 65 fall every year)
     - FACT: Older adults need 2-3x more light!
   - Less light gets to the retina
     - More sensitivity to glare
     - Slower eye reaction to changes in lighting levels, longer time frame for eyes to adjust
2. Federal regulations are phasing out the use of incandescent light bulbs and moving towards LED light bulbs
     - Incandescent bulbs are extremely wasteful, quickly burn through electricity, and get very hot
     - LED bulbs are more efficient, waste less energy, and last longer

Types of Lighting

1) Ambient
   - *General lighting:* provides overall illumination of a room to allow safe navigation throughout home (overhead lighting)
     - To avoid bumping into furniture
     - Multiple light sources can contribute to ambient lighting
2) Task
   - *Practical lighting*: to illuminate certain areas to aid in task completion
     - i.e. *when working on something*, reading, knitting, cooking, applying makeup, shaving
3) Accent
   - *Decorative lighting*: to draw attention to a certain area of a room (aka highlighting)
     - i.e. picture, plant decoration, china cabinets

Most Common Types of Light Bulbs

i. Incandescent

   a. What you commonly picture in terms of light bulbs (used to be most common)
   b. 24-pack @ Home Depot: $25.48 (60W, 750LM) [$1.06 each]
      i. **PROS:** usually least expensive, dimmable, generally offers warmer light
      ii. **CONS:** not as energy efficient, lasts 700 to 1,000 hours, the bulbs get HOT and can pose a fire risk in some situations

ii. Halogen

   a. A variation of incandescent light bulbs
   b. 4-Pack @ Home Depot: $6.97 (60W, 615LM) [$1.74 each]
      i. **PROS:** most similar to natural daylight (“white light”), slightly more energy efficient, dimmable, lasts longer than an incandescent light bulb
      ii. **CONS:** more expensive, bulbs still get hot which may pose a fire risk, oils from your hand can cause the bulb to explode in older models (bulbs need to be changed with some type of hand covering)

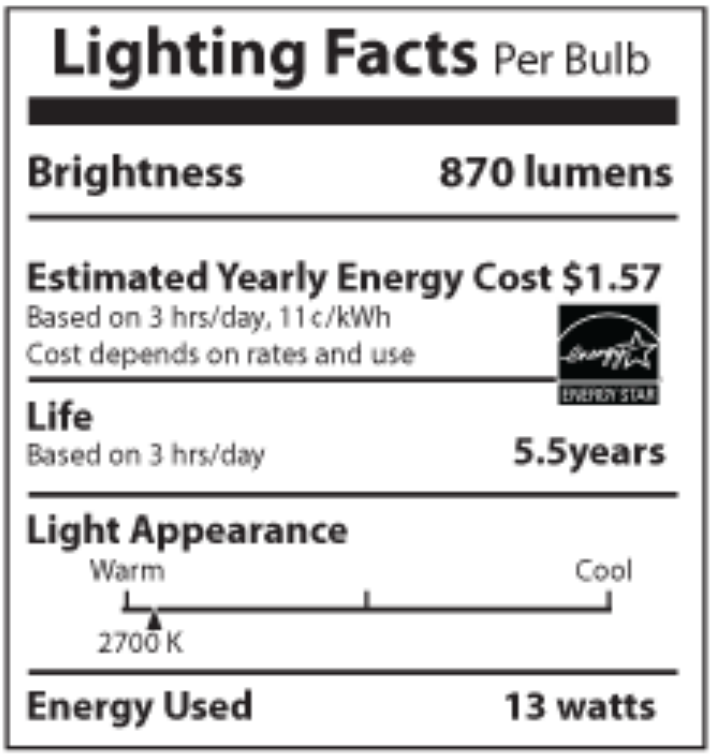
iii. Compact fluorescent bulbs (CFLs)

a. Used as an incandescent light bulb replacement; most fit in lighting fixtures designed for incandescent light bulbs
b. 4-pack @ Home Depot: $6.97 (60W, 5000K, 800LM) [$1.74 each]
    i. **PROS:** much more energy sufficient (consume ¼ energy than incandescent bulbs & can last 10x longer), quiet, instant-on and have warmer, color-corrected tones
    ii. **CONS:** contain traces of mercury so special care needs to be taken when broken and/or discarded

iv. **Light-emitting diode (LED) {BEST OPTION}**

a. 8-pack @ Home Depot: $9.94 (60W, 800LM) [$1.24 each]- come in dim-to-warm option!
    i. **PROS:** long-lasting (can last 10-20x as long as a standard incandescent bulb), extremely energy-efficient (can use ⅛ - ¼ of the energy of an incandescent bulb), inexpensive to operate, creates very little heat
    ii. **CONS:** more expensive initially, important to correctly read packaging to get most for the bulb!

How to Read a Light Bulb Label



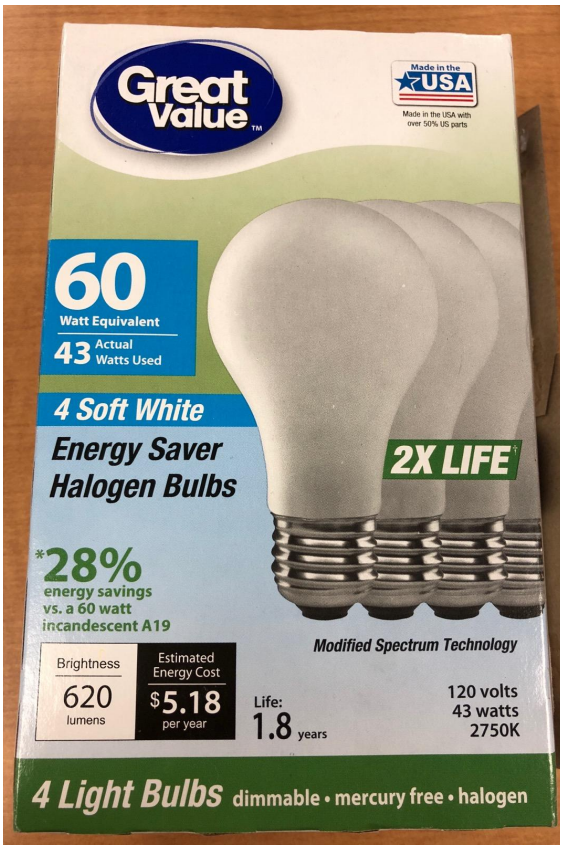
- BRIGHTNESS
    - Lumen: unit measuring amount of brightness a light source emits
    - The more lumens, the brighter the bulb!
        - Recommended lumen breakdown by room (specifically for **ambient** lighting; additional task lighting recommended depending on functional use)
            - Living room: 10-20 lumens per sq. ft (~2,560 LM - 5,120 LM)
            - Dining room: 30-40 lumens per sq. ft (~4,440 LM - 5,920 LM)
            - Bedroom: 10-20 lumens per sq. ft (~2,610 LM - 5,220 LM)
            - Hallways: 5-10 lumens per sq. ft (~325 LM - 650 LM)

- Kitchen *(ambient lighting)*: 30-40 lumens per sq. ft (~5,790 LM - 7,720 LM)
- Kitchen *(task lighting)*: 70 - 80 lumens per sq. ft
- Laundry room: 70-80 lumens per sq. ft (~4,690 LM - 5,360 LM)

Based on approximate room size of home 2,000 sq. feet or less

- ESTIMATED YEARLY COST
  - How much you will pay per year to use the light bulb
  - Based on 3 hrs/day, 11 c/kWh
  - Cost depends on rate & use
- LIFE
  - How long the light bulbs will last (if installed in the correct receptacle)
    - If a non-dimmable bulb is put in a dimmable or 3-way light fixture it will NOT last nearly as long
      - Always make sure to buy dimmable light bulbs for these light fixtures
  - Based on 3 hrs/day
- LIGHT APPEARANCE
  - Kelvin: primary unit used to measure the temperature of the light
  - The higher the Kelvins, the whiter the light!
    - Lower temperature bulbs = warm-whites
    - Higher temperature bulbs = cool-whites
      - **Warm**: aid in relaxation & falling asleep
        - Good for bedrooms & living rooms
      - **Neutral**: help you stay awake & do work
        - Good for **ambient lighting** in kitchens, bathrooms, dining rooms, and offices
      - **Cool**: good for **task lighting** such as reading, under or inside cabinet lighting, and above sinks or bathtubs

- ENERGY USED
  - Watt: a unit of power to measure the amount of energy used by a light source
    - How much “juice” is being taken from your wall
    - **Lower wattage bulbs use less electricity & are more energy-efficient!**
      - **When switching out an incandescent light bulb to an LED, look at how many watts the LED will use, do not just look at the incandescent equivalent watts
      - It is possible that another LED will provide more lumens for a few more watts (want more lumens in order to be brighter!!)
        - The more lumens, the brighter and better.
      - Ex. If it is a 60W incandescent replacement, be sure to focus your search on the highest lumen replacement as long as the LED bulb’s wattage is below 60W (chances are it will be!)**



How to Adapt Lighting for Age-Related Vision Changes

- Less light gets to the retina
  - Use multiple sources of light by combining ambient and task light to increase light levels
  - Select light bulbs with higher lumens (at least 800)
- More sensitivity to glare
  - Increase ambient light levels for more indirect lighting over the entire surface & use lamp shades

    - Place task lighting fixtures to the side rather than in front to avoid glare from surfaces (this may put lamps closer to walls or other structures- do not use halogen bulbs or incandescent in these instances due to increased fire hazard risk)
- Slower adaptation to changes in lighting levels
    - Use consistent lighting in rooms and corridors for transitioning between rooms

Thoughts to Remember

- LED light bulbs are more expensive up to front to purchase, but cost less money in the long run because they are extremely energy efficient & last longer
    - LED lights provide higher lumens while emitting less heat & decreasing the risk for fires!
- Color is important when deciding a replacement bulb
    - **Soft white, warm white *(red/yellow)***: help to calm you and induce sleep
        - Good for bedroom, living room
    - **Neutral white, cool white, daylight *(blue light)*:** help to keep you awake and ready to work!
        - Good for kitchen, bathroom, task lighting for reading

References

American Lighting Association (2018). *Lighting fundamentals.* Retrieved from https://alalighting.com/Lighting-Fundamentals

Electrical Safety Foundation International (2011). Home fire safety for older adults: a safety awareness program toolkit. Retrieved from http://files.esfi.org/file/Home-Fire-Safety-for-Older-Adults-Safety-Awareness-Program-Toolkit.pdf

Guide One Insurance (2018). Electrical Outlet Safety.
Retrieved from https://www.guideone.com/safety-resources/electrical-outlet-safety

Homestructions (n.d.). Electrical outlet safety tips.
Retrieved from http://www.homestructions.com/outlets-adapters/electrical-outlet-safety-tips/

Pooky (2016, Feb 10). *Home lighting design: a guide to layering light*. Retrieved from https://www.pooky.com/inspiration/all-about-lighting/home-lighting-design-a-guide-to-layering-light

Schmidt, P. (2018). *How to calculate lumens per square foot*. Retrieved from https://www.hunker.com/13412735/how-to-calculate-lumens-per-square-foot

Scripps Network (2018). *Light bulbs: Know the different types*. Retrieved from https://www.hgtv.com/design/decorating/design-101/light-bulbs-know-the-different-types

YourStorageFinder (2018). *Tips to declutter and organize your home for seniors and individuals with special needs*. Retrieved from https://www.yourstoragefinder.com/declutter-and-organize-your-home-seniors-special-needs