

# Daylighting Inside and Out

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Unconventional Ways to Bring More Natural Light Into and Throughout a Building



# Best Practices

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# Learning Objectives

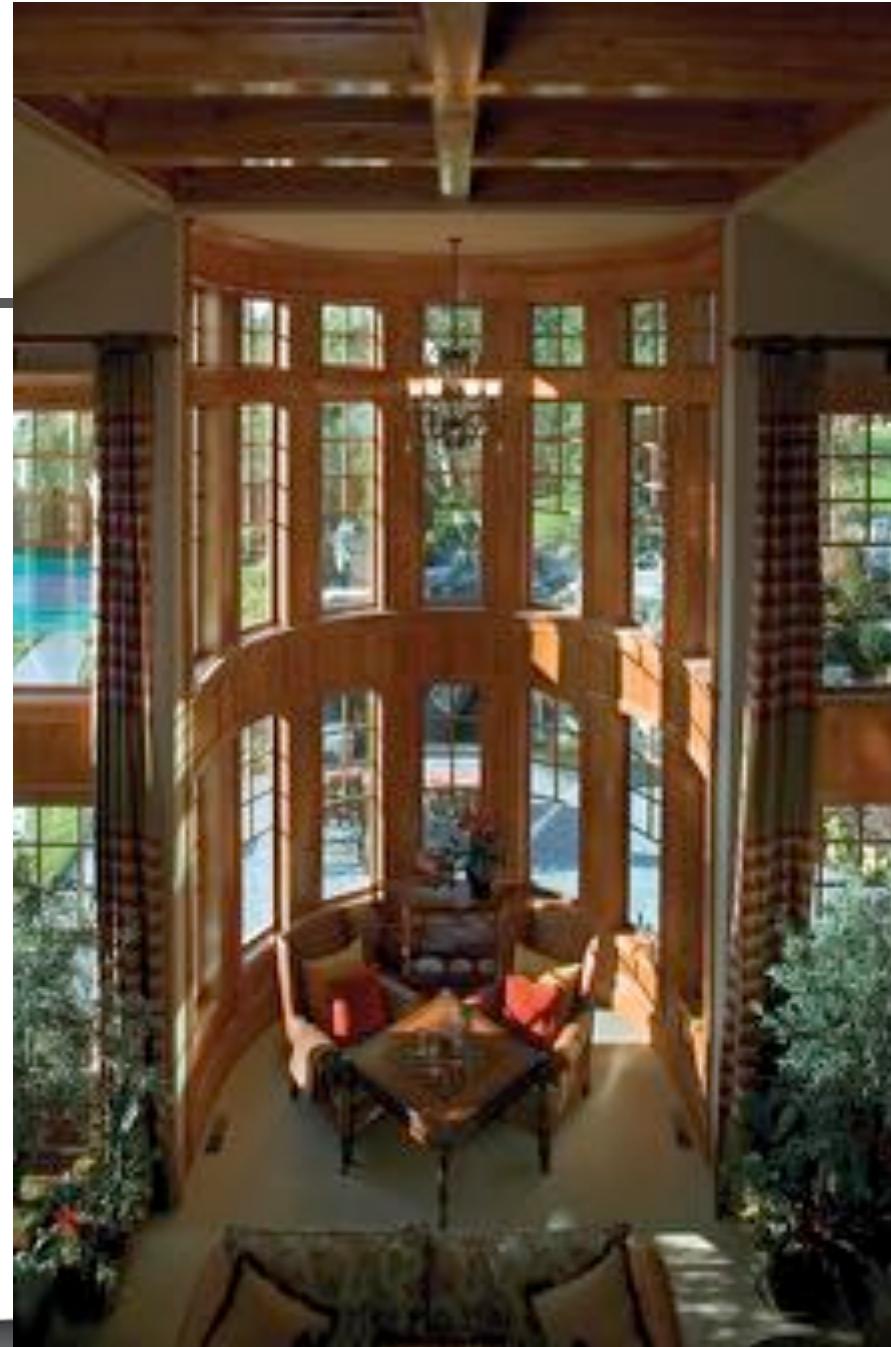
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- Identify the beneficial effects of daylight on building occupants.
- Discuss unconventional daylighting options with windows and skylights for energy conservation and healthy natural ventilation.
- Describe unconventional daylighting options with French doors, patio doors, and sliding glass walls that increase views and decrease need for artificial lighting.
- Examine case studies where adding extra natural lighting played a major part in the design of a green building.
- Calculate potential daylighting credits for green building certification.

# Introduction

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- Exposure to natural light is beneficial for building occupants on many levels.
- We all know it intuitively and we feel better in interior spaces with natural light.
- Plus, studies conclusively demonstrate measurable benefits for health, moods, learning, and productivity.
- There are many strategies for bringing natural light into and throughout a building.



# Learning Objective 1

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# Exposure to Daylight Promotes Health

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- Natural light helps us feel more connected to the outdoors and the natural world.



# Benefits for Health of Workers

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# Improved Work Efficiency in the Workplace

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# Views Are Healthy

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# Natural Light in School Settings

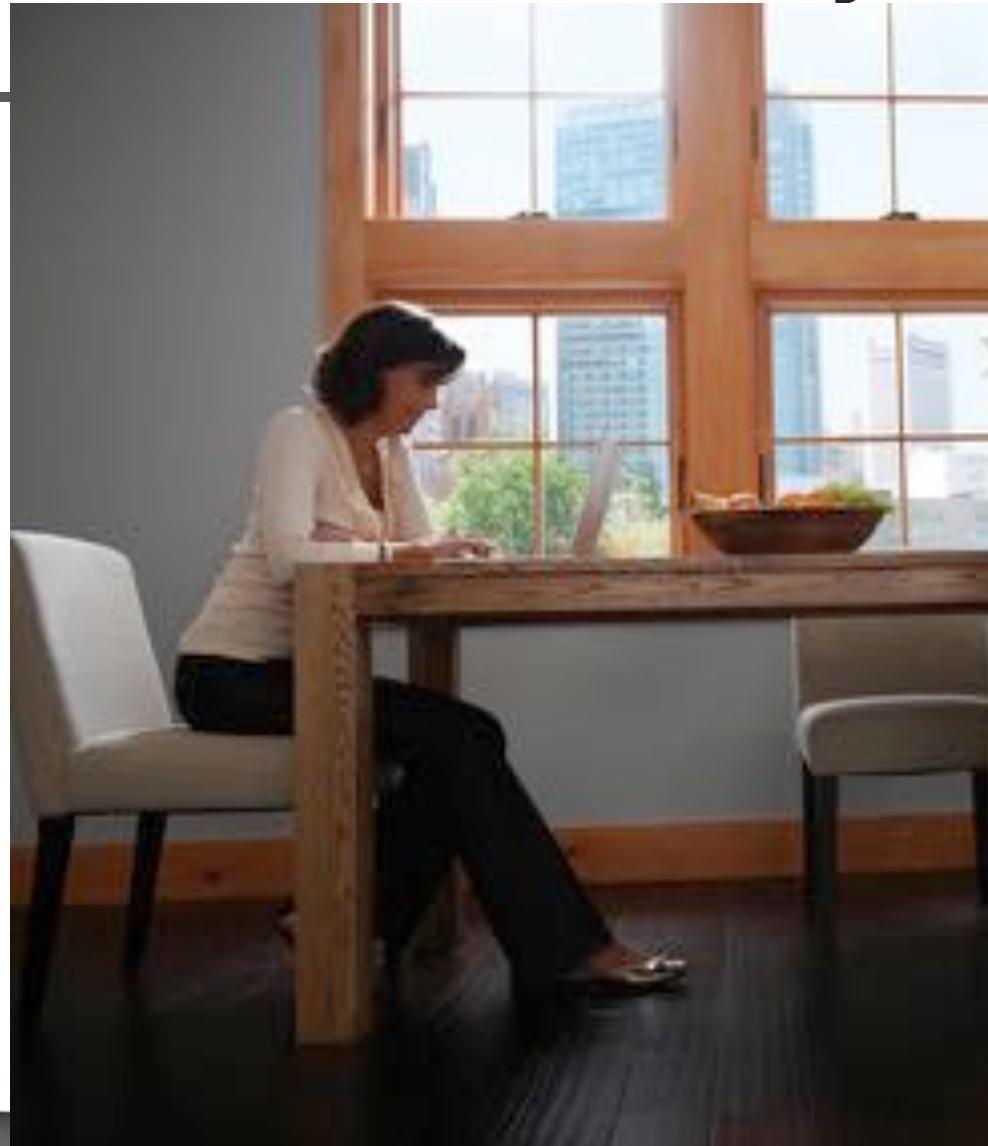
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# Improved Mental Function and Memory Recall

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- People perform 10–25 percent better on tests of mental function and memory recall when they work in a room with daylight and a view, as compared to those with no daylight or view.



# Hospital and Health-Care Settings

- Adequate and appropriate exposure to light is critical for health and well-being of patients as well as staff in health-care settings.



## The Impact of Light on Outcomes in Healthcare Settings

Anjali Joseph, Ph.D., Director of Research,  
The Center for Health Design

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Robert Wood Johnson Foundation.

  
THE CENTER FOR  
HEALTH DESIGN  
[www.healthdesign.org](http://www.healthdesign.org)

# Benefits for Aging Populations and Eyesight

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- In a properly designed building, natural light floods the environment, making everyday tasks easier and safer to accomplish while also improving occupants' moods.



# Natural Ventilation



# Learning Objective 2

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# Unique Design Options



# Natural Light in Stairwells and Landings



# Interior Windows

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# Clerestory or Stacking Windows



# Transoms



# Sidelights

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# Fanlights

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# Fanlights

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# Window in Gable End

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- A gable end provides an excellent space for a window to provide extra daylight.



# Garden Windows



# Bay and Bow Windows



# Skylights

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# Skylights in Hallways

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# High Windows for Kitchens and Bathrooms

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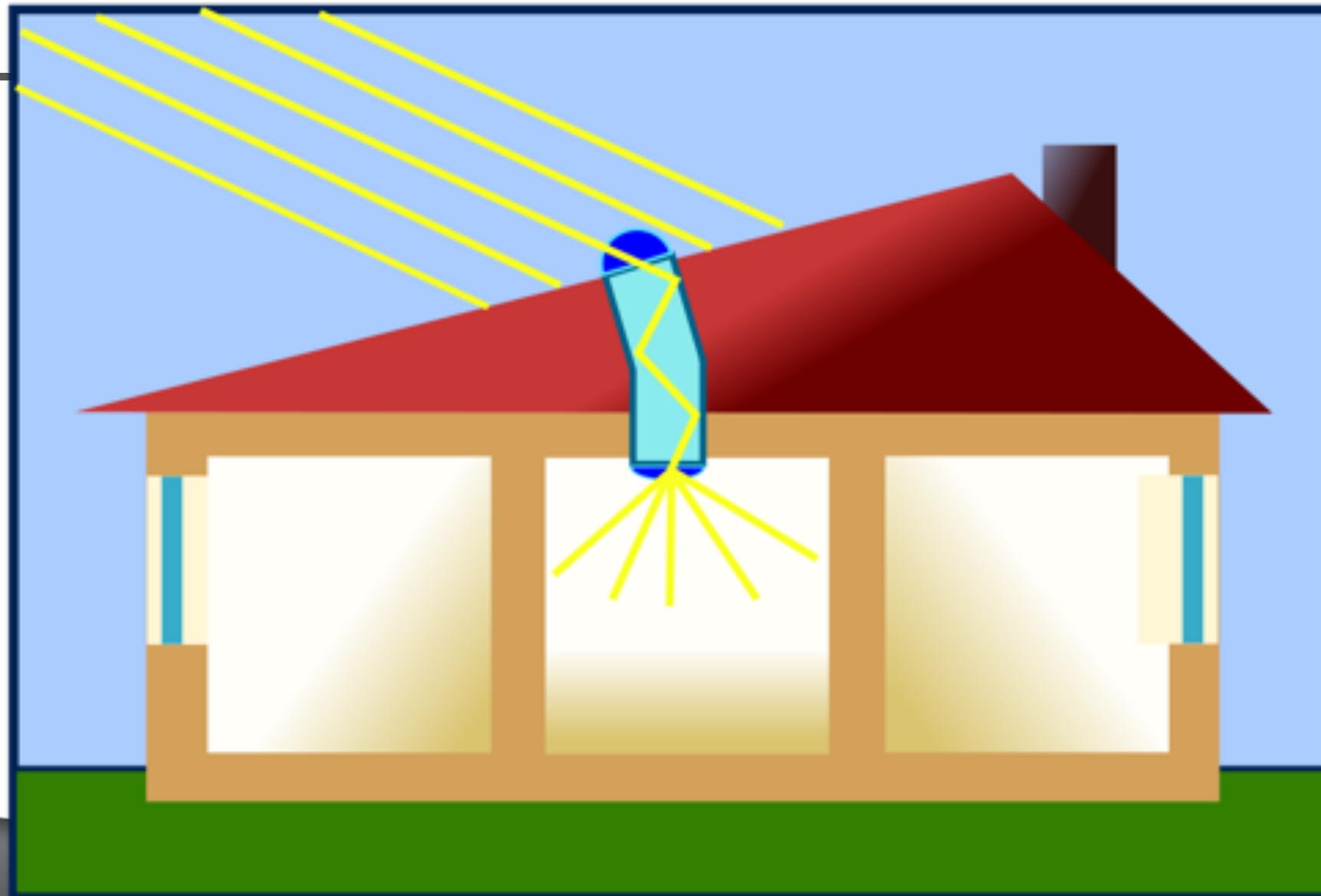


# Obscure Glass for Bathroom Privacy

- The specification of obscure glass in bathrooms provides both natural light and privacy.
- When the windows are operable, natural ventilation is an added feature.



# Light Tubes



# Wall of Windows in Kitchens



# Narrow Windows Tucked Between Upper Cabinets



# Kitchen Window as Backsplash



# Learning Objective 3

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# French Doors

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- Idea: Replace exterior door with French door.



# Replacing Windows With French Doors

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- When designing a renovation, consider that an existing window in the living room, for instance, might function better as a French or sliding patio door.



# Replacing Interior Doors With French Doors



# Interior French Doors From Kitchens or Dining Rooms



# Interior French Doors Into Offices

A level of soundproofing is provided when the doors are closed, yet the office user and those outside the office space still feel visually connected to the home or office environment.



# Pair French Doors With Transoms and Side Lights

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# Series of French Doors in a Wall

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This design calls attention to the outside through the expanse of French doors that now act as both doors functionally and a set of windows visually.



# French-Style Sliding Doors

To accommodate tight spaces that might not have adequate room for the in-swing and out-swing operation, one option is a pair of French sliding doors.



# Moving Glass Wall Systems: Bi-Fold



# Moving Glass Wall Systems: Pocket Glass Wall



# Moving Glass Wall Systems: Stacking Glass Wall



# Sunroom, Atrium, or Skywall

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- A space with abundant intense or muted natural illumination
- Depends on the orientation and the geographic location of the structure



# Learning Objective 4

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# Case Study: Building a Forever Home

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Floor-to-ceiling aluminum windows create a mural of expansive views, the flow of fresh air, and natural light.



# Building a Forever Home

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# Case Study: Building a Forever Home



# Case Study: Garfield Elementary School, Olympia, Washington



# **Case Study: Garfield Elementary School, Olympia, Washington**



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# Learning Objective 5

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# Daylighting Points Possible for LEED v4



## Intent of EQ Credit: Daylight

To connect building occupants with the outdoors, reinforce circadian rhythms, and reduce the use of electrical lighting by introducing daylight into the space.

# Possible Points: Daylight Credit, BD&C

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- The Daylight credit applies to these rating BD&C systems:
  - New Construction (1–3 points)
  - Core & Shell (1–3 points)
  - Schools (1–3 points)
  - Retail (1–3 points)
  - Data Centers (1–3 points)
  - Warehouses & Distribution Centers (1–3 points)
  - Hospitality (1–3 points)
  - Health Care (1–2 points)



# Three Options for Earning Points

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- Three options for earning daylight points include:
- Option 1 – Simulation: Spatial daylight autonomy and annual sunlight exposure
  - (2–3 points, 1–2 points Health Care)
- Option 2 – Simulation: Illuminance calculations
  - (1–2 points)
- Option 3 – Measurement
  - (2–3 points, 1–2 points Health Care)



# Quality Views Points Possible for LEED v4

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## Intent of EQ Credit: Quality Views

To give building occupants a connection to the natural outdoor environment by providing quality views.

# Possible Points: Quality Views, BD&C

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- The Quality Views credit applies to these rating BD&C systems:
  - New Construction (1 point)
  - Core & Shell (1 point)
  - Schools (1 point)
  - Retail (1 point)
  - Data Centers (1 point)
  - Warehouses & Distribution Centers (1 point)
  - Hospitality (1 point)
  - Health Care (1–2 points)



# Requirements for Quality Views Points

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- For New Construction, Core & Shell, Schools, Retail, Data Centers and Hospitality, the requirements include:
  - Achieve a direct line of sight to the outdoors via vision glazing for 75 percent of all regularly occupied floor area.
  - View glazing in the contributing area must provide a clear image of the exterior, not obstructed by frits, fibers, patterned glazing, or added tints that distort color balance.



# Requirements for Quality Views Points

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- Additionally, 75 percent of all regularly occupied floor area must have at least two of the following four kinds of views:
  - Multiple lines of sight to vision glazing in different directions at least 90 degrees apart;
  - Views that include at least two of the following: (1) flora, fauna, or sky; (2) movement; and (3) objects at least 25 feet (7.5 meters) from the exterior of the glazing;
  - Unobstructed views located within the distance of three times the head height of the vision glazing; and
  - Views with a view factor of 3 or greater as defined in “Windows and Offices; A Study of Office Worker Performance and the Indoor Environment.”



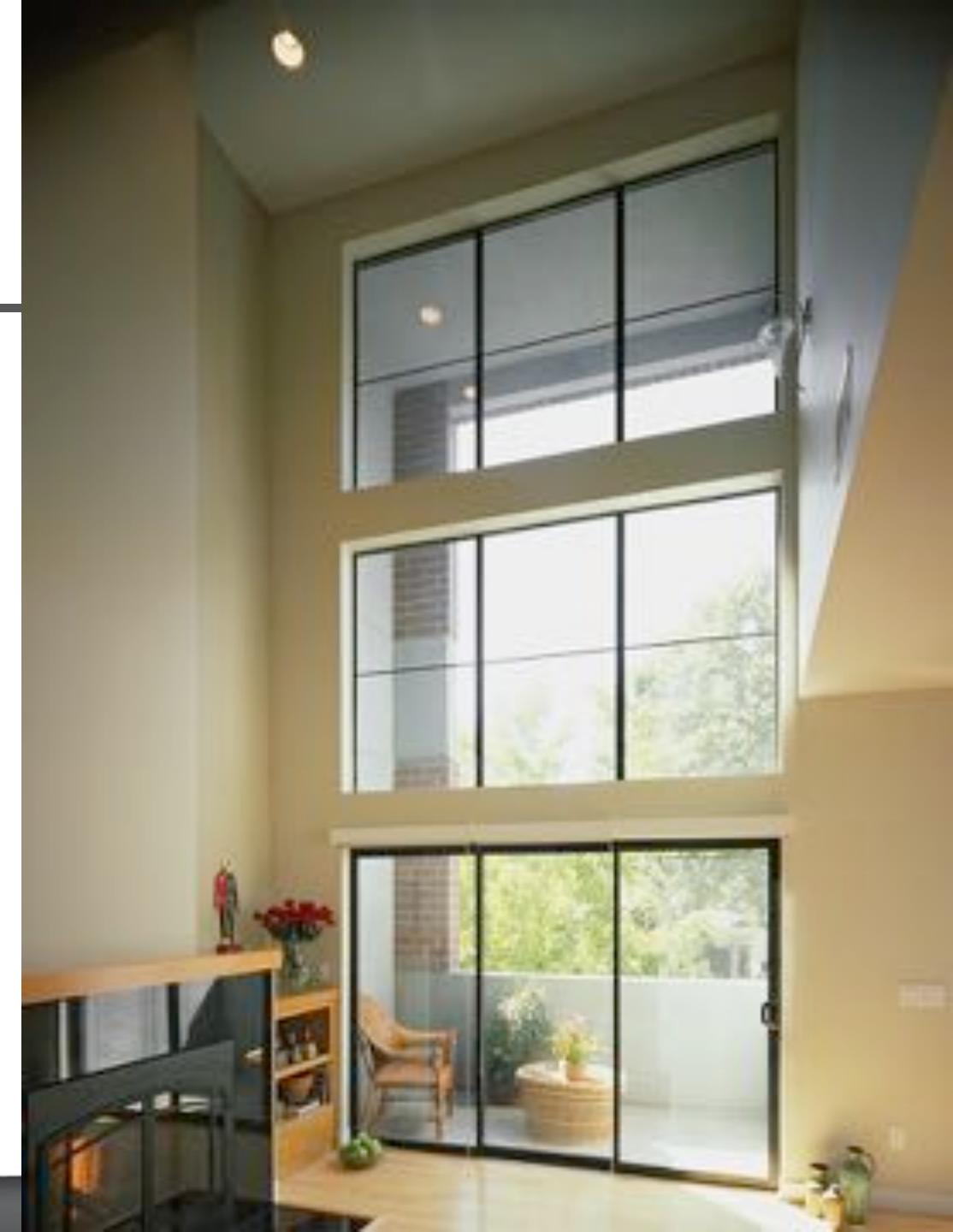
# Conclusion

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# Learning Objectives Review

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# Thank You

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