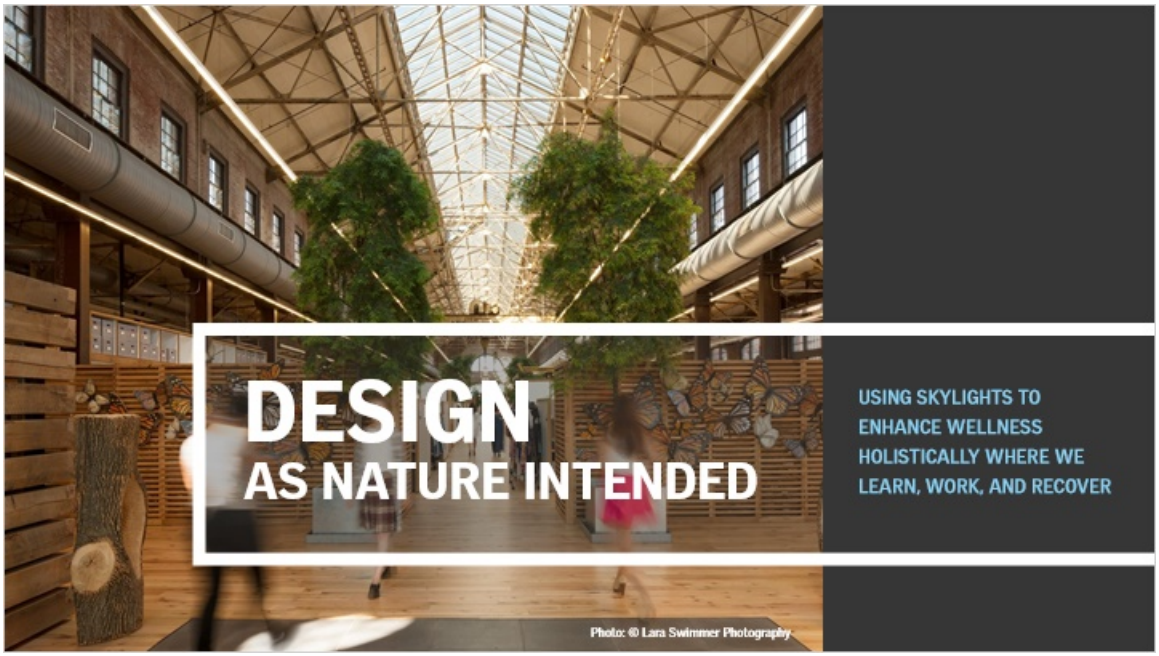
Design as Nature Intended

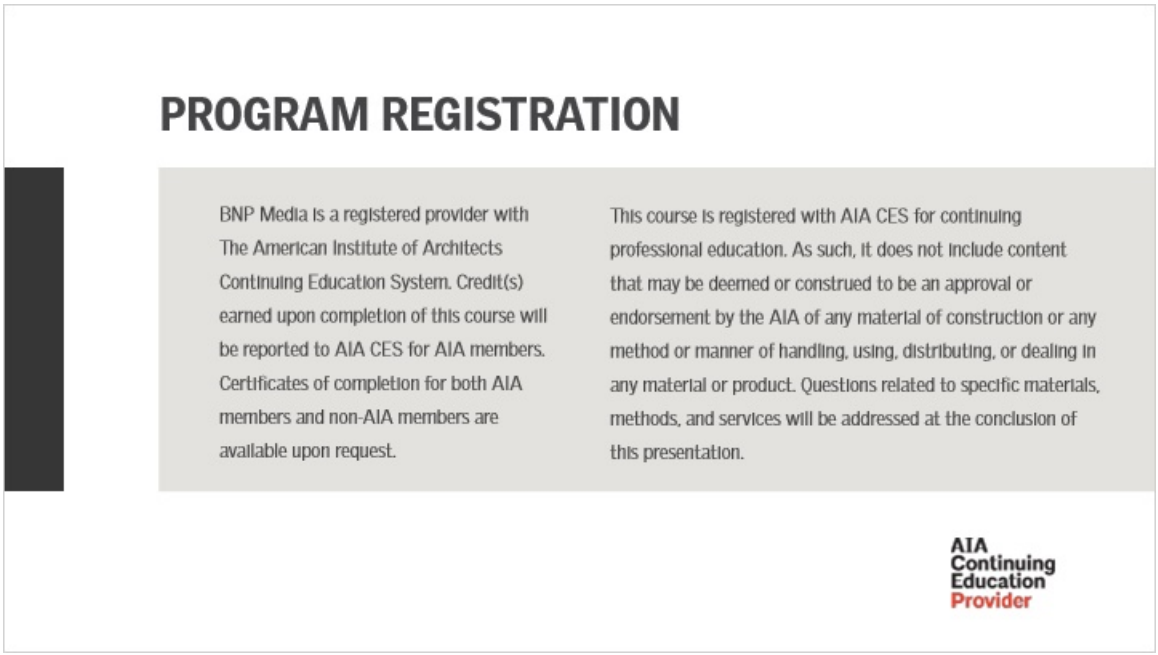
1.1 Design as Nature Intended



Notes:

Design as nature intended. Using Skylights to Enhance Wellness Holistically Where We Learn, Work, and Recover.

1.2 Program Registration



Notes:

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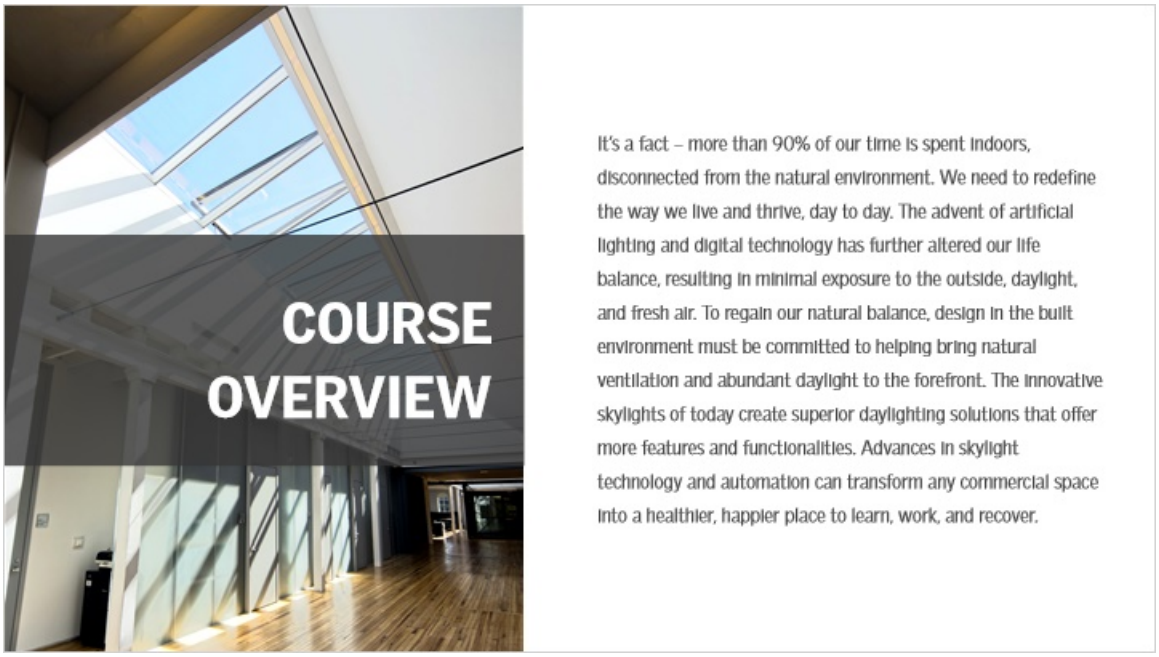
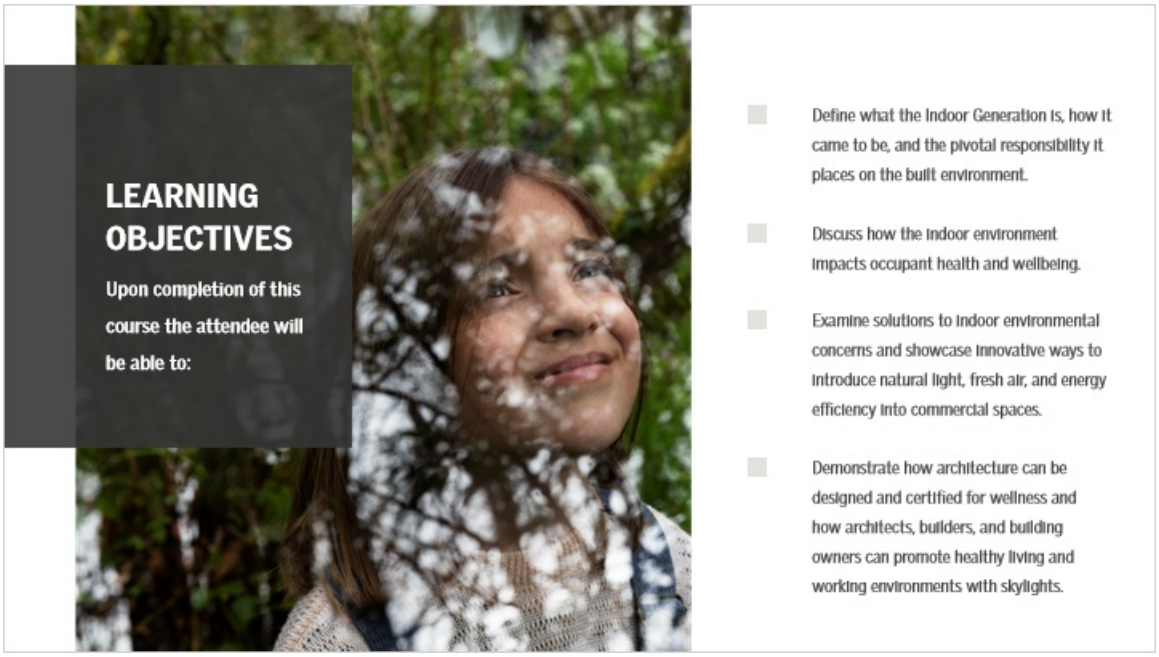
1.4 Course Overview



Notes:

It's a fact - more than 90% of our time is spent indoors, disconnected from the natural environment. We need to redefine the way we live and thrive, day to day. The advent of artificial lighting and digital technology has further altered our life balance, resulting in minimal exposure to the outside, daylight, and fresh air. To regain our natural balance, design in the built environment must be committed to helping bring natural ventilation and abundant daylight to the forefront. The innovative skylights of today create superior daylighting solutions that offer more features and functionalities. Advances in skylight technology and automation can transform any commercial space into a healthier, happier place to learn, work, and recover.

1.5 Learning Objectives



Notes:

Upon completion of this course the attendee will be able to:

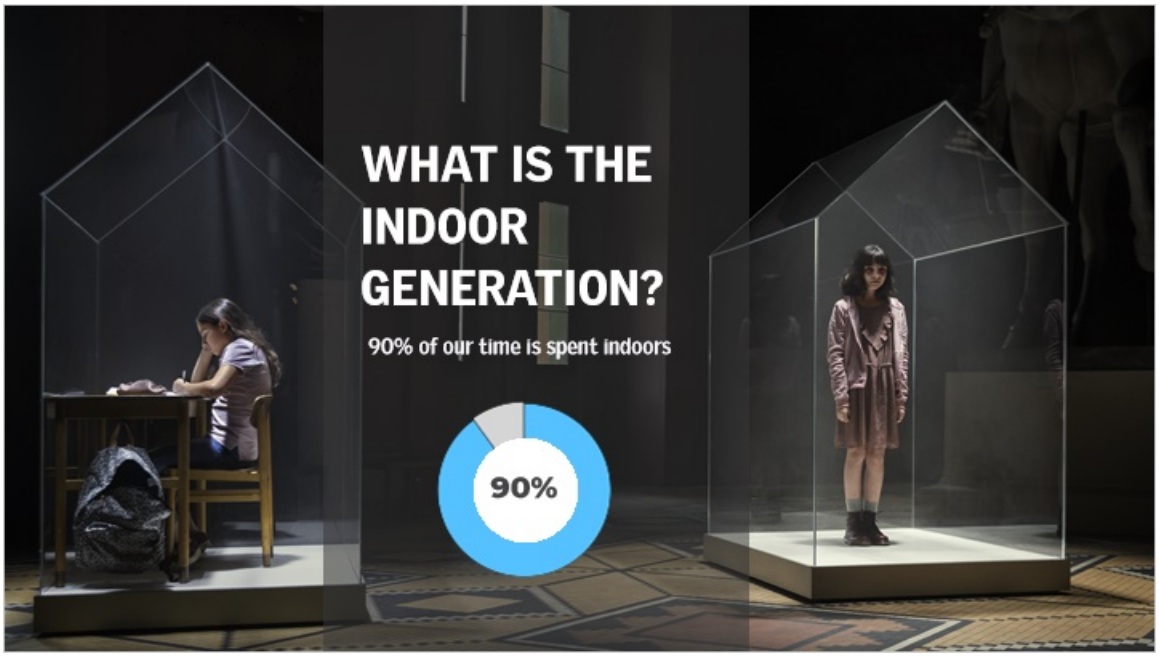
- Define what the Indoor Generation is, how it came to be, and the pivotal responsibility it places on the built environment.
- Discuss how the indoor environment impacts occupant health and wellbeing.
- Examine solutions to indoor environmental concerns and showcase innovative ways to introduce natural light, fresh air, and energy efficiency into commercial spaces.
- Demonstrate how architecture can be designed and certified for wellness and how architects, builders, and building owners can promote healthy living and working environments with skylights.

1.6 Section 1

Notes:

Section 1. The indoor generation is a reality. Today, we spend 90% of our time indoors without enough daylight or fresh air. We don't think about it anymore - but science has shown that this can be harmful to our health and wellbeing.

1.7 What is the Indoor Generation?

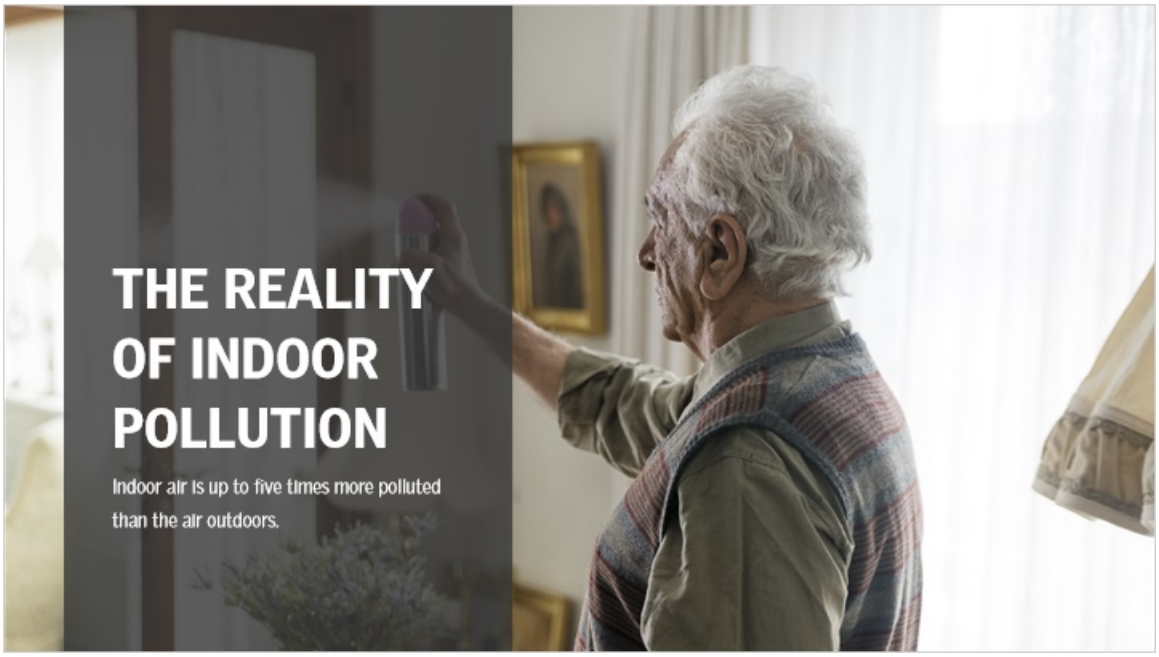


Notes:

90% of our time indoors means time spent with minimal daylight and fresh air. Spending time between four walls occurs not only at home, but where we learn and work and recover.

The shift to working indoors in large factories and office complexes began this transformation, redefining the way we live and thrive day to day. With the advent of artificial lighting and digital technology, the built environment has altered our balance - today our only encounter with nature is often as we leave one building for another - leaving home and traveling to school, a doctor's office, a shopping center, and returning back home. All of this adds up to minimal exposure to the outside and its benefits.

1.8 The Reality of Indoor Pollution



Notes:

The climate-controlled environments which dominate our lives do not offer the ideal living conditions. INDOOR AIR CAN BE FIVE TIMES MORE POLLUTED THAN OUTSIDE AIR. Indoor air is polluted by a seemingly endless list of sources: from excess CO_2 to food particles from cooking, pet hairs, moisture from baths, showers and washing machines. At schools, workplaces, shopping areas, and hospitals, the picture is even more complicated. Cleaning products, industrial production, concentration of use, and high volume of people intensify pollutants in indoor air, compromising air quality. The more activity there is in a room, the more dust and other particles are stirred up and circulated.

1.9 Video

Notes:

Video.

1.10 The Reality for Us

Notes:

There's a new responsibility placed on the built environment today. If the majority of our time is spent time indoors, and most of that time is in closed off environments, can we create a better interface with the natural surroundings? Do we pay a price for leaving nature behind?

1.11 Video

Notes:

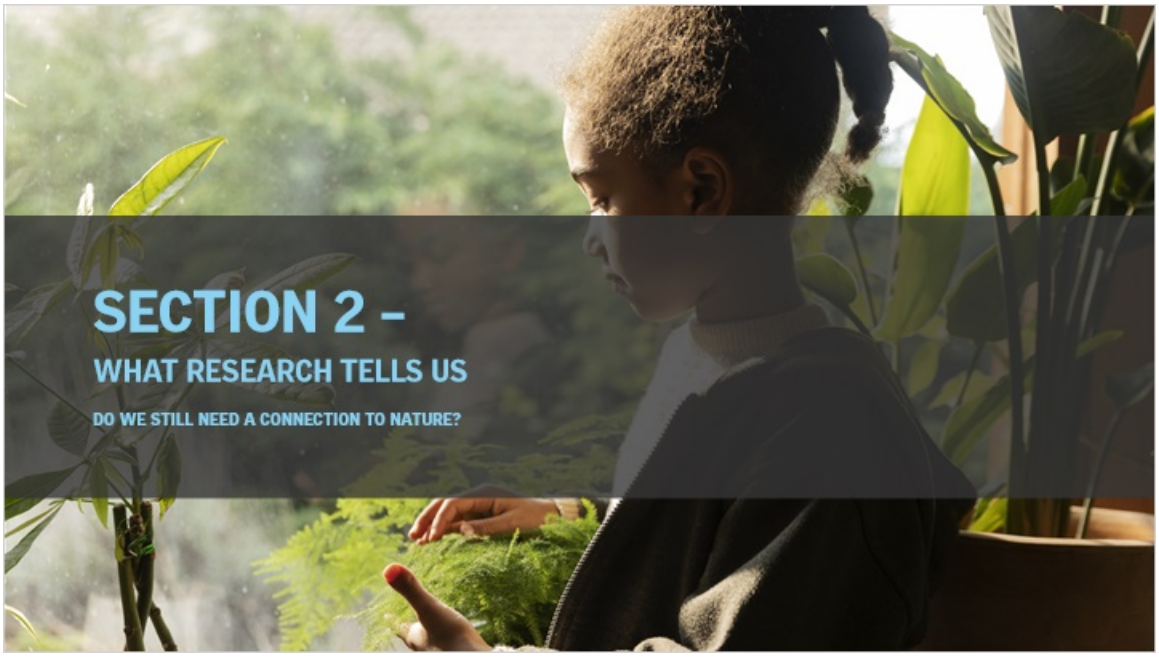
Video.

1.12 It’s Time…

Notes:

Let’s remember where we come from. We are a product of nature. It's time we design our built environments to take full advantage of today's smart technology to boost occupants' health and wellness, as well as our aesthetic connection to nature.

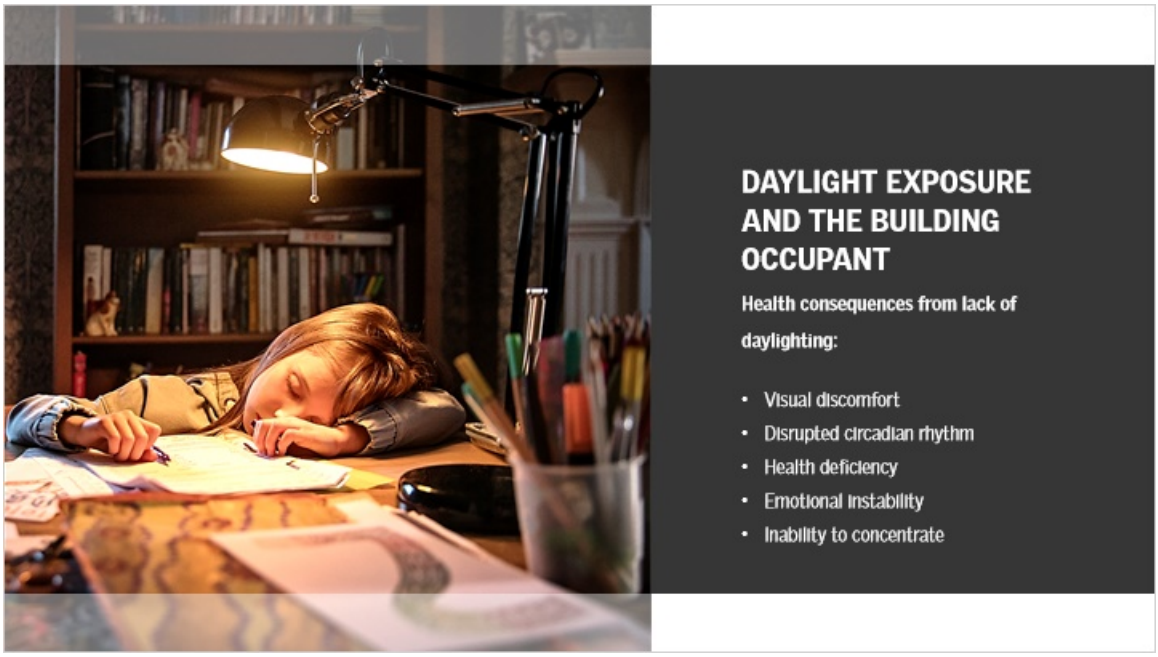
1.13 Section 2



Notes:

Section 2

1.14 Daylight Exposure and the Building Occupant



Notes:

Living without daylight and fresh air affects us on all levels, most quantifiably when it comes to our health. We pay a high price for leaving nature behind.

Indoor lighting plans should, at all times, allow occupants to easily orientate themselves and move freely around in the rooms and the building. If the lighting of a space is unsuitable or inadequate, and makes it difficult to see properly, it will influence our performance (the visual system), as well as affect our health (the circadian system) and personal well-being (the perceptual system). It can result in unnecessary eye strain and give rise to symptoms such as eye irritation, fatigue, and headache. Lighting conditions that can cause these symptoms are poor brightness and contrast, high luminance differences, and flickering.

Inadequate light exposure can disrupt normal circadian rhythms and have a negative effect on human performance, alertness, health and safety. We know that outdoor daily light exposure allows us to regulate our sleep/wake timing and levels of alertness. When we spend almost all of our time indoors (Klepeis, 2001; Leech, 2002; Schweizer, 2007), we are exposed to relatively low light levels of a limited spectral range, and patterns of light and darkness occur at irregular intervals. Preliminary evidence suggests that low light exposure is associated with diminished health and well-being and can lead to reduced sleep quality, depressed mood, lack of energy and impaired social relations.

In order to align our body clock, morning light is the most important signal. Light in the morning increases our levels of alertness, allowing increased performance at the beginning of the day. From mid-morning to early evening, high levels of daylight allow us to regulate our sleep/wake timing and levels of alertness; whereas reduced light levels in the evening and a dark room with blackout promote sleep at night.

Bright lighting is generally believed to make people more alert, and well-daylit spaces are generally perceived by occupants to be “better" than dim gloomy ones (Mardaljevic et al., 2012). Daylighting has been associated with improved mood, enhanced morale, less fatigue, and reduced eyestrain (Robbins, 1986). Many studies show that the

performance and productivity of workers in office, industrial, and retail environments can increase with the quality of light.

Studies also show that daylit environments lead to more effective learning. It was found that students in classrooms with the most window area or daylighting produced 7% to 18% higher scores on the standardized tests than those with the least window area or daylight (Heschong, 2002).

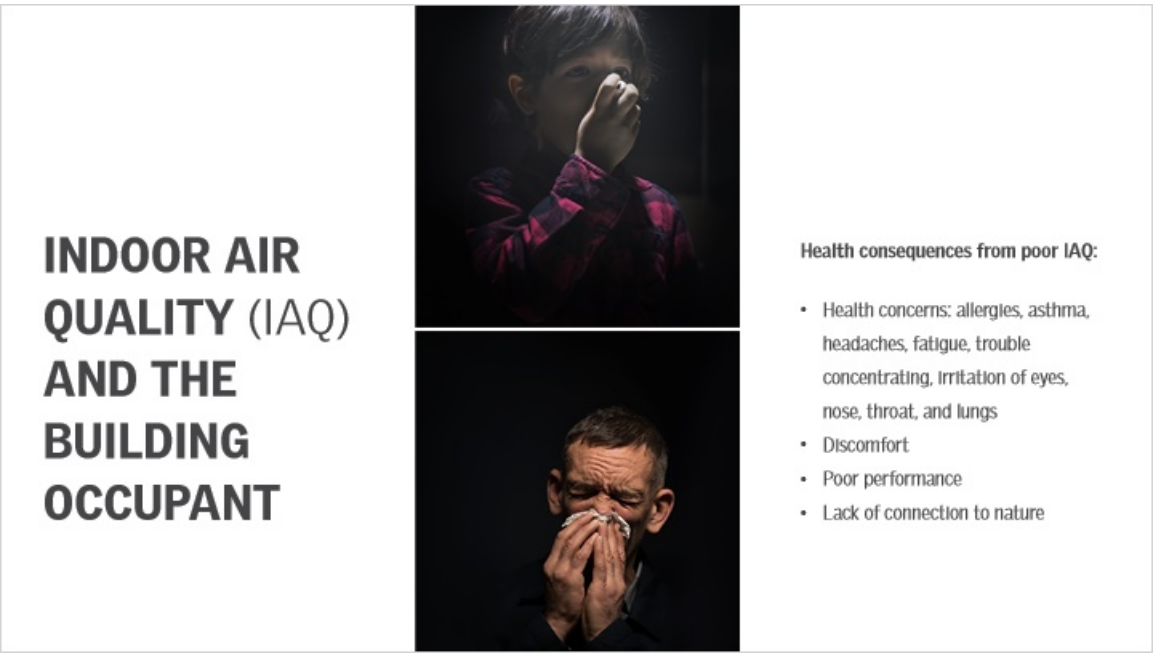
Studies suggest that higher doses of daylight would leave people with a feeling of being more positive about life (Espiritu et al., 1994), while social interactions immediately following exposure to over 1 000 lx were more co-operative and less quarrelsome (Aan het Rot et al., 2008).

Along with daylight comes exposure to the outdoor environment. A view to nature may have a positive influence on people's sense of well-being (Kaplan, 2001), better subjective health (Kaplan, 1993), higher environmental satisfaction (Newsham et al., 2009), better mood (Grinde and Grindal Patil, 2009), reduced health problems (Heschong Mahone Group, 2003), job satisfaction, and recovery of surgical patients (Ulrich, 1984).

Another benefit of using daylighting for ambient and/or task illuminance in a space is that it can save energy by reducing the need for electric lighting. Several studies in office buildings have recorded the energy savings for electric lighting from using daylight in the range of 20-60% (Galasiu, 2007).

Removing children's connection to daylight is particularly detrimental. In this era of digital entertainment, it can be difficult for young people to make space for simpler pleasures like the wonderful feeling of sunlight. But the fact is that lack of adequate direct or indirect daylight can cause vitamin D deficiency, disrupt children's body clocks, and affect their general mood and their ability to concentrate.

1.15 Indoor Air Quality (IAQ) and the Building Occupant



Notes:

It is also crucial to understand what the quality is of the indoor air we breathe. Good indoor air quality may be defined as air that is free of pollutants that cause irritation, discomfort, or ill health to occupants (AIVC, 1996).

Indoor air quality is influenced by the generation of pollutants indoors but also depends on the outdoor air around the building. Indoor air quality has a considerable impact on health and comfort. Today, indoor air quality faces increased pressure due to the constant tightening of the building envelope, and introduction of many new materials that may emit harmful pollutants.

Indoor air contains many different compounds, some of which have a negative impact on health or comfort (Bluyssen, 2009). These compounds may include:

- Gases; e.g. formaldehyde, organic chemicals (VOC) and inorganic chemicals (NOX, SOX, etc.).
- Particles; e.g. house dust and combustion products.
- Radioactive gas; radon.
- Biological; e.g. mold, fungi, pollen and dust mites
- Water vapor (humidity)

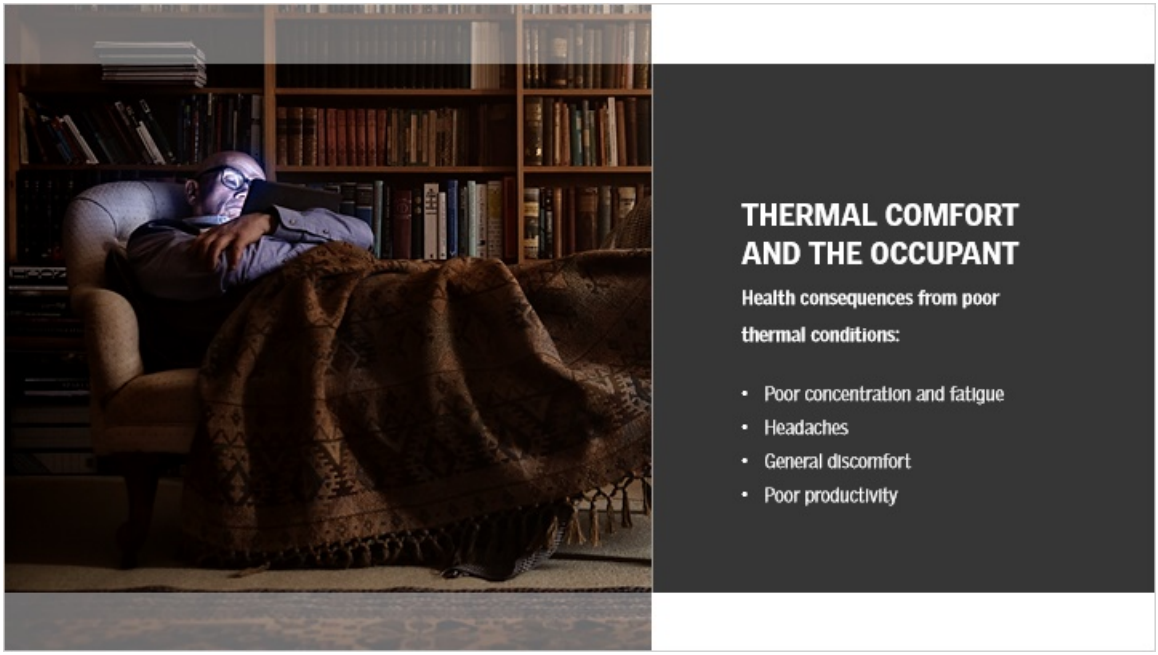
The individual or combined effects of the many compounds in indoor air on human health are not fully understood, but major research studies have shown that indoor air quality has an important impact on the health of humans in buildings. Symptoms of these problems include headaches, eye- nose- or throat irritation, dry cough, itchy skin, fatigue, and concentration difficulties. Damp buildings can cause illnesses such as coughs, wheezing, allergies, and asthma.

Children are extremely vulnerable to changes in IAQ. On average, children spend around 200 days in school per

year and 70% of that time is spent inside classrooms. A growing number of children are “burdened with ailments that challenge their ability to be present and fully engaged at school” according to a Harvard University 2018 study. Asthma and allergy symptoms are associated with indoor air quality. Globally, the prevalence of children affected by asthma has become an increasing problem in the last few decades.

- Investigations on the mental performance of occupants in office buildings have shown that poor air quality reduces mental performance, while good air quality improves it (Seppanen et al., 2006).
- In a recent study by Harvard and Syracuse University, employees in well ventilated buildings performed 61 percent better in their cognitive tasks than counterparts in unventilated spaces.
- Doubling ventilation efforts caused cognitive performance to increase by more than 100 percent.
- Several studies have shown that students perform better in school with improved Indoor Air Quality.

1.16 Thermal Comfort and the Occupant



Notes:

Many people associate thermal comfort directly with air temperature, but this is not the only factor, as the temperature subjectively experienced in a room is a combination of several parameters. These include the presence of draughts, air infiltration, and solar gain. Arguably, the most important parameter is people's different expectations of thermal comfort. The individual experience is vital.

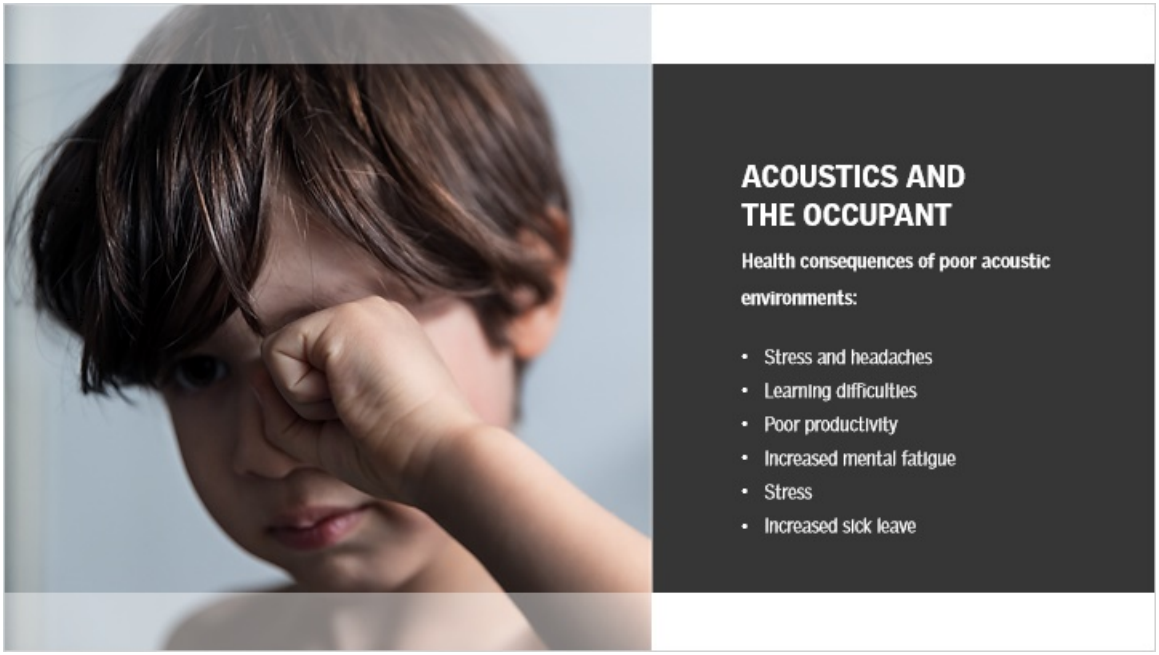
Thermal discomfort occurs when the thermal environment does not meet the requirements of the human mind or body. In cold environments, we feel cold and our hands and feet drop in temperature; we get goose bumps and even start to shiver, in extreme cases resulting in hypothermia. At the other extreme, in warm environments perspiration will start, possibly leading to hyperthermia in extreme cases. All of these responses are reactions to non-comfortable environments.

More typically, thermal discomfort causes lack of concentration, headaches, fatigue, and poor productivity. Thermal comfort is more than just pleasant conditions; it is part of a vital survival behavior.

- Most studies on the impact of temperature have been conducted in climate chambers. They show that the ability to learn and perform work tasks is certainly influenced by the thermal environment. For both school work and office work, the relative number of errors made is not influenced by temperature, whereas the relative speed of learning and working is decreased. For both office and school work, the effect is seen when a very high temperature is compared to a more typical temperature; the relative performance is typically improved up to 10%.

- Using ventilated windows and skylights allows for direct control over thermal comfort. Blending ventilated skylights can also minimize heating and cooling costs. Glazing designs yield other building efficiencies. By using daylight to its full potential, the electricity demand for lighting during daytime can be significantly reduced or even eliminated.

1.17 Acoustics and the Occupant



Notes:

One important function of the building envelope is to protect the interior from unwanted outdoor noise. Sound insulation is an important parameter of building components, as outdoor noise can have negative effects on health, mood, and learning capabilities.

Noise can have a significant impact on the health and performance of building occupants. Stress, headache, and learning difficulties can all be caused by noise. Acoustic irritants can even cause aftereffects, disrupting sleep patterns and contributing to poor rest.

Scientists believe that noise can:

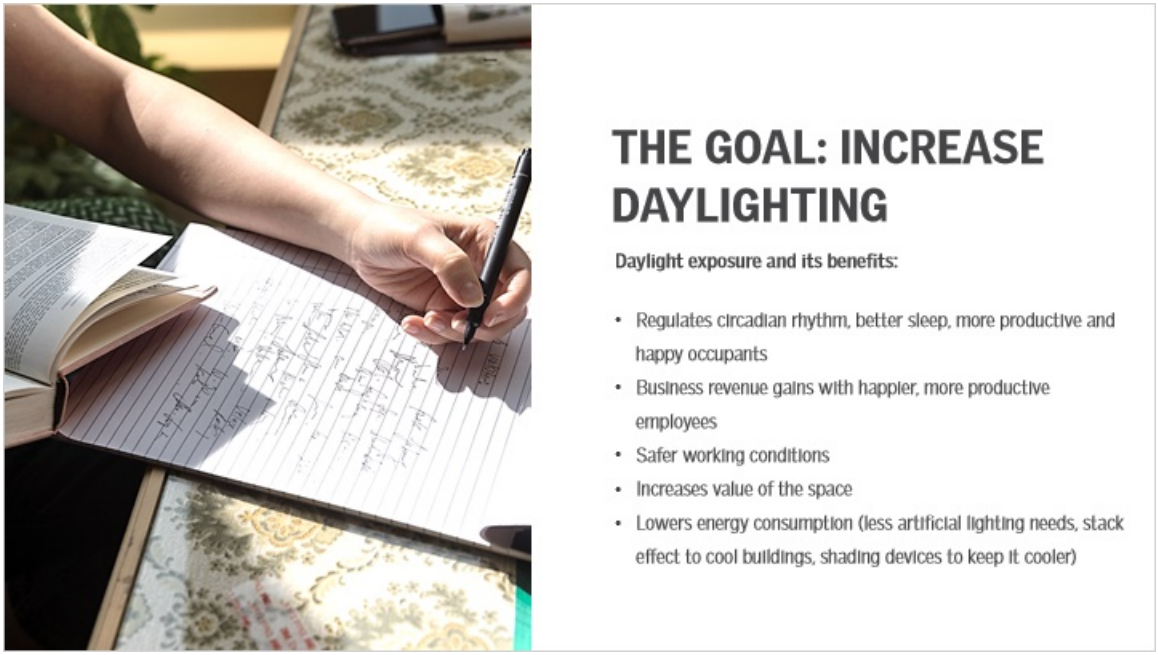
- Lower productivity
- Cause increased metal fatigue
- Trigger stress
- Result in extra sick leave.

1.18 Section 3

Notes:

Section 3

1.19 The Goal: Increase Daylighting

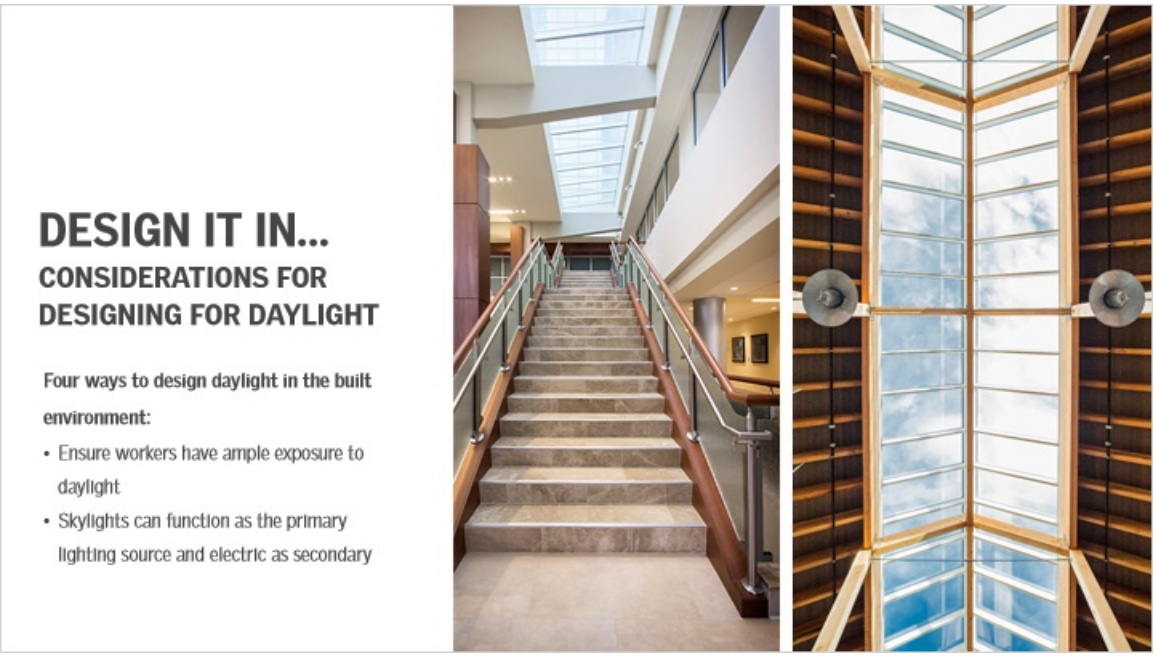


Notes:

The benefits of daylight exposure are great. They include benefits for people: a well-regulated circadian rhythm, better sleep, and more productive and happy building occupants. For employers, daylighting creates business revenue gains with happier, more productive employees in safer working conditions.

Natural daylight increases the value of the space and also lowers energy consumption (less artificial lighting needs, stack effect to cool buildings, shading devices to keep it cooler).

1.20 Design it in… Considerations for Designing for Daylight



Notes:

How can we integrate the benefits of daylighting into our learning, working and recovery spaces. There are several ways that skylights can facilitate bringing more daylight into the built environment.

First, ensure that workers have ample exposure to daylight. Skylights can bring natural light into area where traditional façade windows can't go. Skylights can function as the primary lighting source and electric as secondary.

1.21 Design it in… Considerations for Designing for Daylight

Notes:

Second, consider incorporating skylight shades to control the level of daylight and glare. This allows for ideal and individualized control of lighting.

1.22 Design it in… Considerations for Designing for Daylight

Notes:

Third, plan skylight locations according to the building configuration. Invest in daylight solutions where the vast majority of employees spend time or congregate.

1.23 Design it in… Considerations for Designing for Daylight

Notes:

Finally, utilize glazing technologies that can increase energy efficiency and diffuse daylight to eliminate glare, hot spots and sharp shadows that may hinder comfort. We'll discuss these technologies in greater depth in Section 4.

1.24 The Goal: Better Ventilation

Notes:

Better ventilation leads to improved cognition and focus, and better performance for students and workers.

1.25 Design it in… Considerations for Designing for Ventilation

Notes:

Skylights and windows offer the natural design solution to achieving greater ventilation.

When possible, open office windows to control humidity and release stale air for fresh air throughout the day.

1.26 Design it in… Considerations for Designing for Ventilation

Notes:

Incorporate venting skylights that monitor indoor air quality and release built up CO2 levels for healthier indoor air.

1.27 Design it in… Considerations for Designing for Ventilation

Notes:

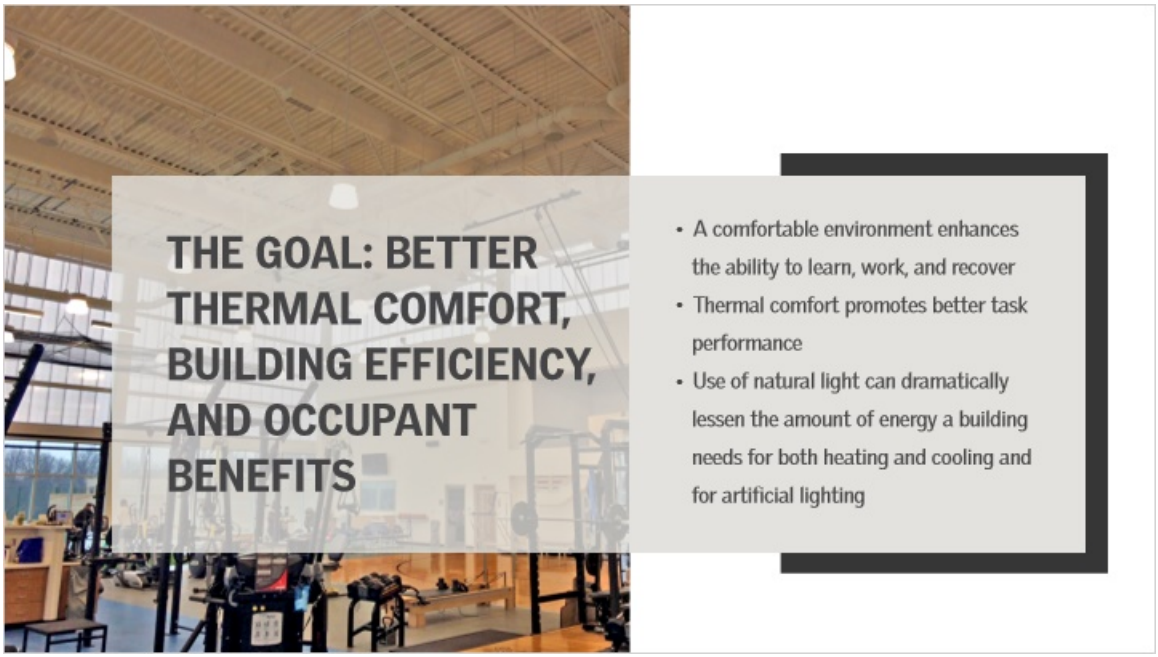
Give workers control over workspaces with individual remotes that open and close overhead skylights.

1.28 Design it in… Considerations for Designing for Ventilation

Notes:

Program ventilating skylights throughout the day to coincide with employee breaks, lunchtime, or after hours for night cooling.

1.29 The Goal: Better Thermal Comfort, Building Efficiency, and Occupant Benefits

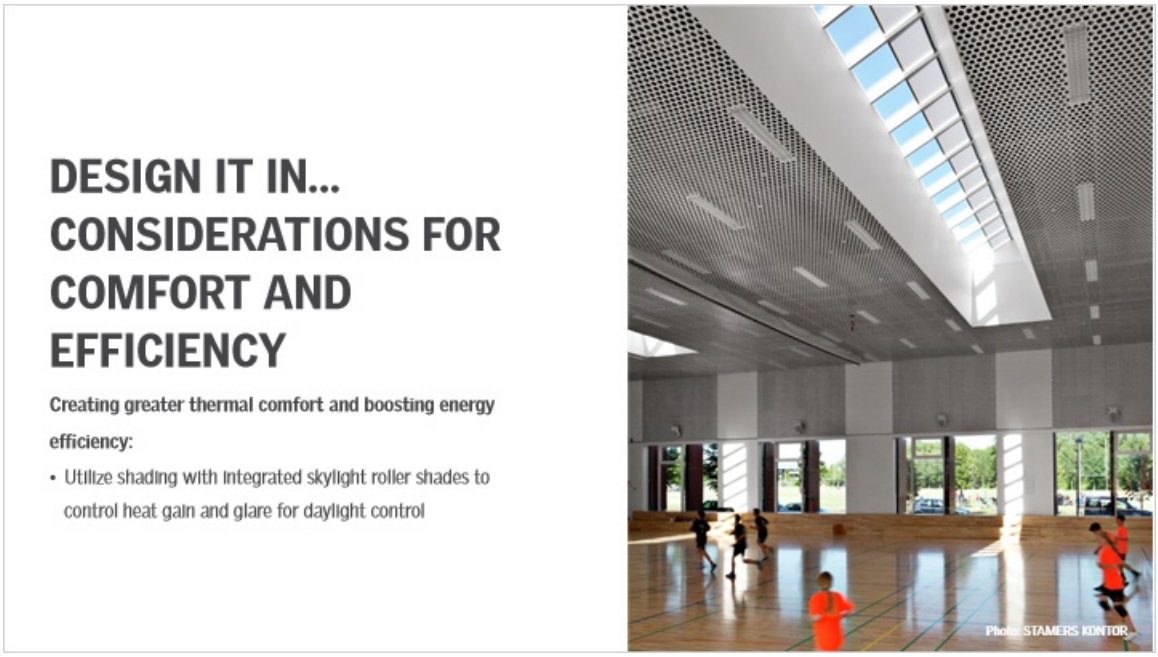


Notes:

A comfortable environment enhances the ability to learn, work, and recover. There are multiple benefits when designing for both better comfort and greater efficiency.

Thermal comfort promotes better task performance. Use of natural light can dramatically lessen the amount of energy a building needs for both heating and cooling and for artificial lighting.

1.30 Design it in… Considerations for Comfort and Efficiency

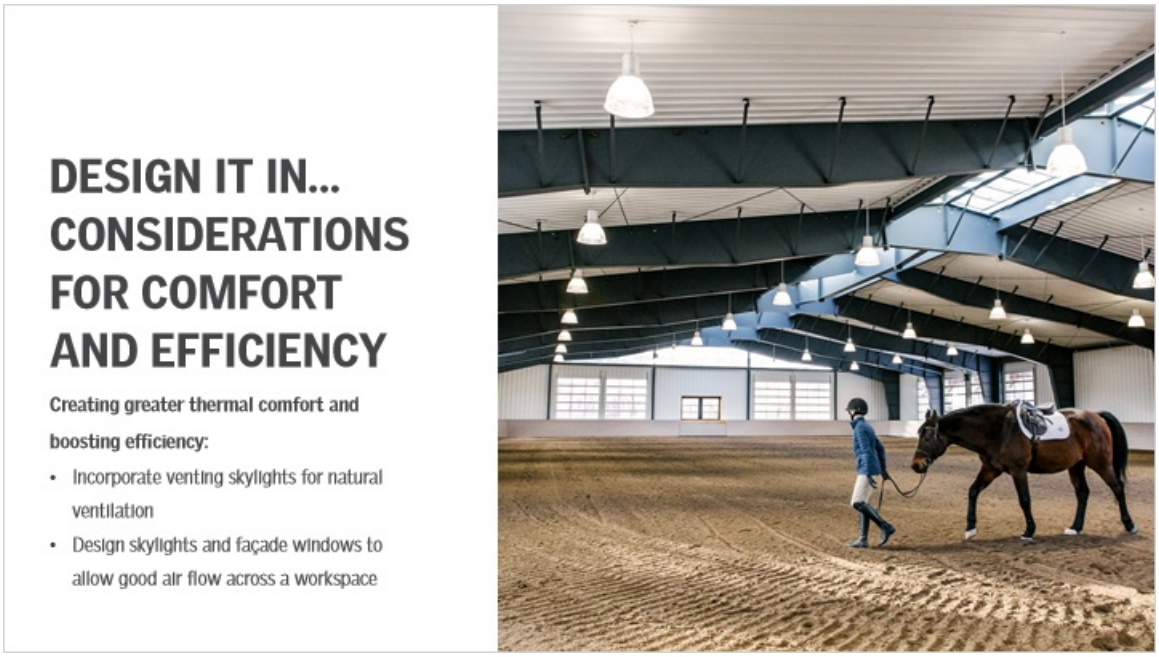


Notes:

Utilizing skylights in a building design, whether new construction or remodel, means capturing efficiencies and creating a better and more individualized thermal environment for occupants.

Applying shading with integrated skylight roller shades controls heat gain and glare for daylight control.

1.31 Design it in… Considerations for Comfort and Efficiency

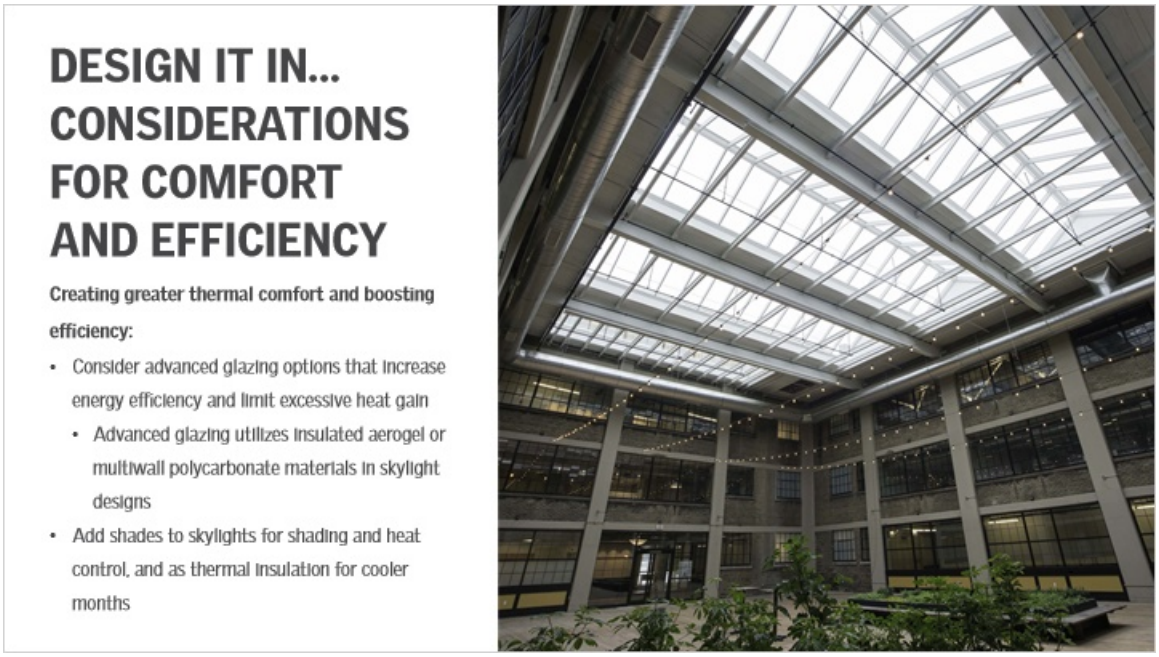


Notes:

For both individualized and efficient thermal comfort,

- Incorporate venting skylights for natural ventilation.
- Design skylights and façade windows to allow good air flow across a workspace.

1.32 Design it in… Considerations for Comfort and Efficiency



Notes:

Looking for higher efficiency in a building?

- Consider advanced glazing options to increase energy efficiency and limit excessive heat gain. Advanced glazing utilizes insulated aerogel or multiwall polycarbonate materials in skylight designs.
- Add shades to skylights for shading and heat control, and as thermal insulation for cooler months.

1.33 Design it in… Considerations for Comfort and Efficiency

DESIGN IT IN… CONSIDERATIONS FOR COMFORT AND EFFICIENCY

Creating greater thermal comfort and boosting efficiency:

- Incorporate energy efficient vertical windows and skylights to provide natural daylight throughout an office and limit need for artificial lighting
- Specify energy efficient mechanical venting in skylights to use natural ventilation strategies, limiting HVAC use
- Incorporate skylight shades or photovoltaic glass to lessen solar heat gain or filter out UV and infrared radiation for better thermal insulation

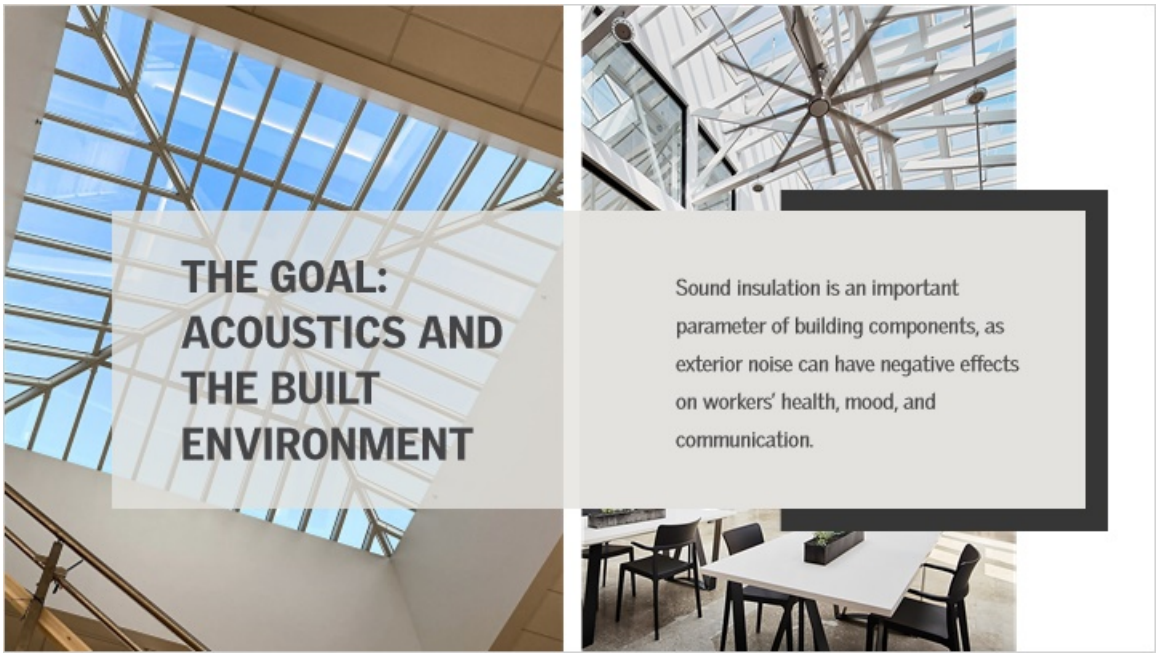
Photo: STAMERS KONTOR

Notes:

Advances in glazing and skylight technology have created groundbreaking avenues for more efficient buildings. These allow the design professional to:

- Incorporate energy efficient vertical windows and skylights to provide natural daylight throughout an office and limit need for artificial lighting.
- Specify energy efficient mechanical venting in skylights to use natural ventilation strategies, limiting HVAC use.
- Consider solar powered shades or PV glass to generate power and provide energy.

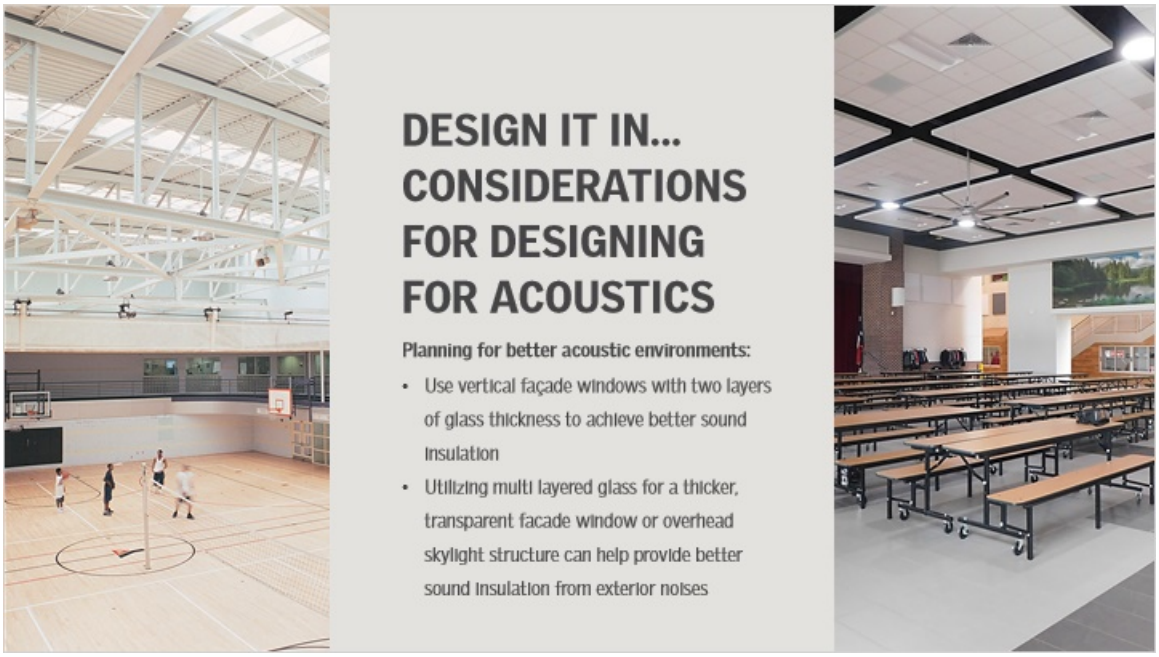
1.34 The Goal: Acoustics and the Built Environment



Notes:

Sound insulation is an important parameter of building components, as exterior noise can have negative effects on workers' health, mood, and communication.

1.35 Design it in… Considerations for Designing for Acoustics

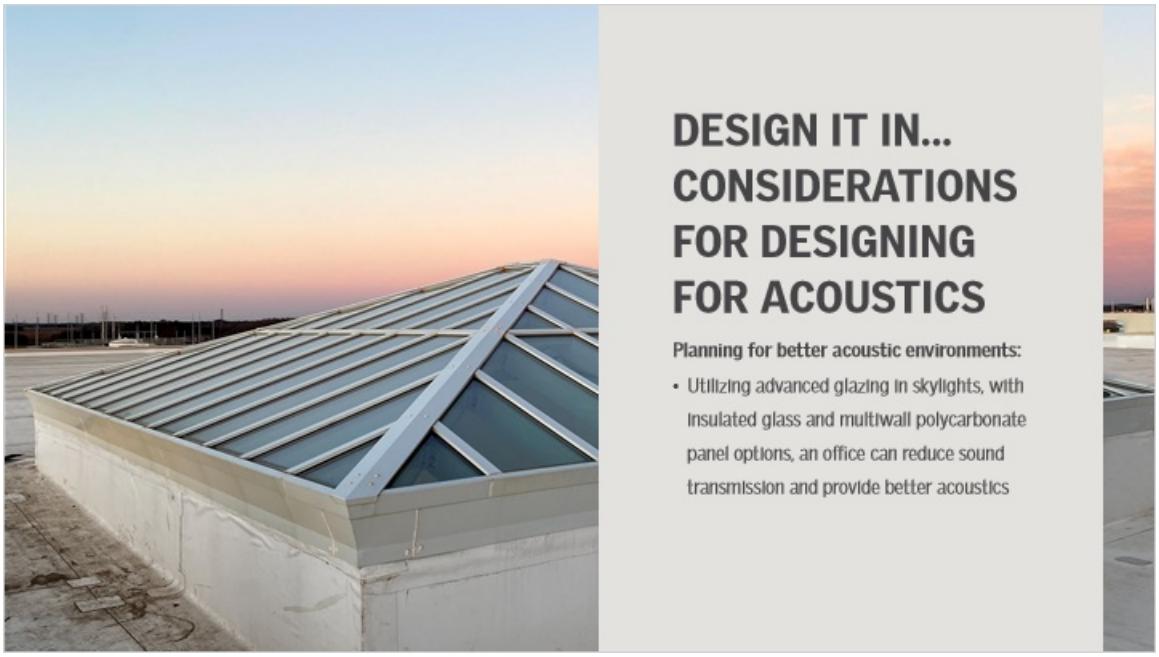


Notes:

Skylights can help a building provide a better acoustic environment.

One design tip is to use vertical façade windows with two layers of glass thickness to achieve better sound insulation. Utilizing multi layered glass for a thicker, transparent facade window or overhead skylight structure can help provide better sound insulation from exterior noises.

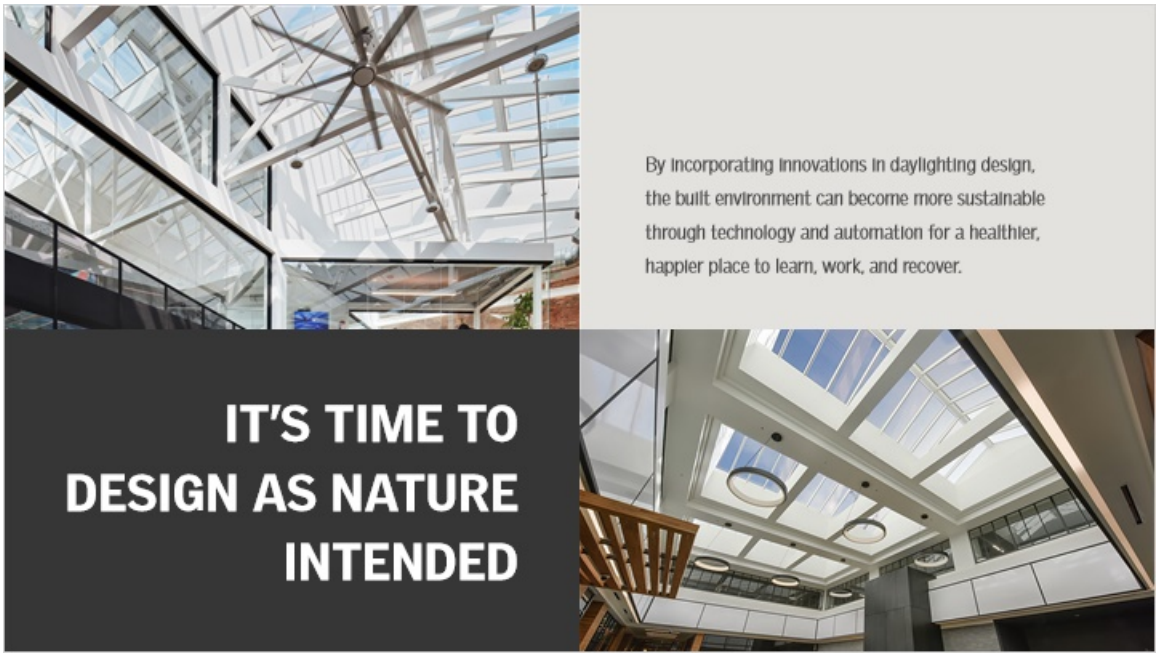
1.36 Design it in… Considerations for Designing for Acoustics



Notes:

By utilizing advanced glazing in skylights, with insulated glass and multiwall polycarbonate panel options, an office can reduce sound transmission and provide better acoustics.

1.37 Design it in… Considerations for Designing for Acoustics



Notes:

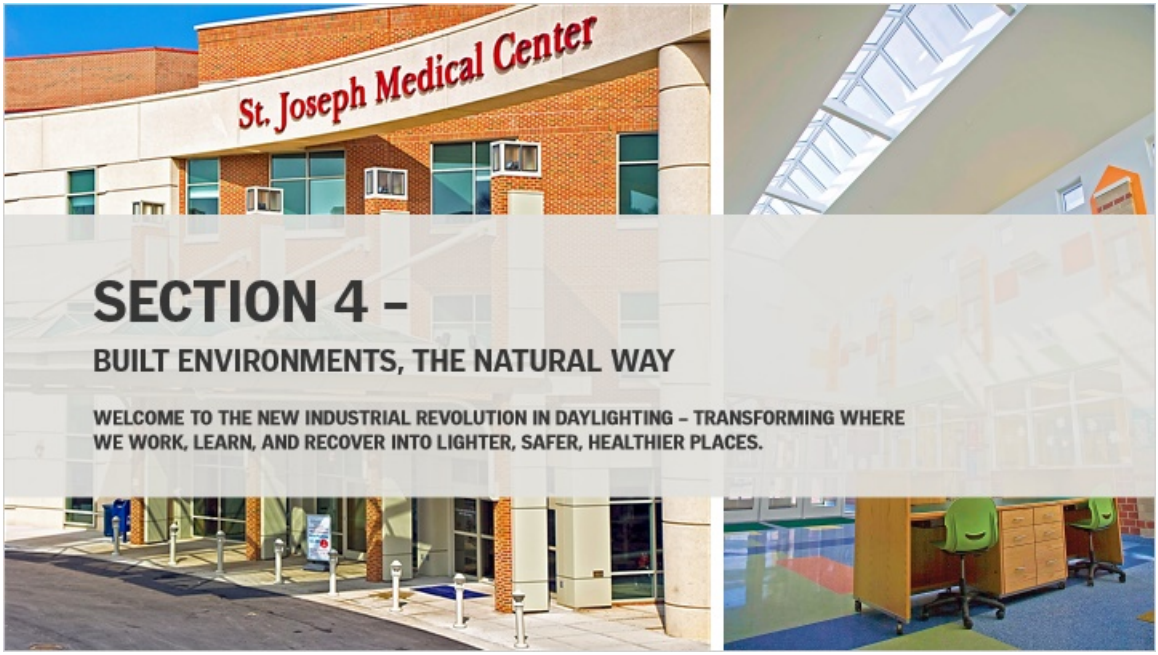
By incorporating innovations in daylighting design, the built environment can become more sustainable through technology and automation for a healthier, happier place to learn, work, and recover.

1.38 Video

Notes:

Video.

1.39 Section 4



Notes:

Welcome to the new industrial revolution in daylighting - transforming where we work, learn, and recover into lighter, safer, healthier places.

1.40 Video

Notes:

Video.

1.41 Daylighting Revolution - Skylight Innovations Fueling the Revolution

Notes:

Incorporating more natural daylight into built-environments is key to increased health and wellbeing, while also minimizing energy expenses. The latest advances in skylights are fueling the design revolution that promises to reconnect us to our environment and its benefits. These technologies offer building blocks for the design professional intent on maximizing daylighting, natural ventilation, and a healthier environment for school, hospital, and office and industrial projects.

Innovations in daylight harvesting have changed how we think of available daylight. With the revolutionary design offered by angular skylights, commercial spaces can now harvest additional sun rays that would typically pass over a building. The advanced geometric pattern of ridges and ribs off a flat wall created by octagonal dome skylights maximize capture of the the sun when it's at low angles. This allows the dome to capture and transmit light to a building that would typically bounce off. Product simulations have shown these commercial dome skylights harvest up to 56 more minutes of additional sunlight per day, for a potential yearly lighting savings of up to 340 hours.

Tubular skylights capture daylight at its maximal source and transmit it to the interior of a building, where exterior windows or exposures aren't available. This allows greater energy and monetary savings and sustainability, too, with higher energy efficiency and a lower carbon footprint. Tubular skylights offer a quick and easy way to bring natural light to any space.

1.42 Daylighting Revolution - Skylight Innovations Fueling the Revolution

DAYLIGHTING REVOLUTION
SKYLIGHT INNOVATIONS FUELING THE REVOLUTION

Skylight Automation:

- Control systems that work based on schedules or that constantly monitor the indoor air quality
- Can open shades or skylights for fresh air or close for additional shading or anti-glare

Notes:

Not only can modern skylights open and close, or deploy shades, on an automated system, new skylights operate with an intelligent, programmable control system that enables the unit to detect and close the modules in the case of rain or strong winds.

For energy savings, a daily program can be set that controls heat gain and glare. Innovative skylights are capable of including a fully-integrated chain actuator that automatically opens and ventilates a space, for a comfortable indoor climate. By offering units that ventilate, hot air that naturally accumulates near the ceiling, can be expelled to keep the interior temperature cooler. Modern skylights can also offer smart roller shades that can even be programmed to respond to luminosity or temperature, eliminating glare and reducing heat gain.

1.43 Daylighting Revolution - Skylight Innovations Fueling the Revolution

DAYLIGHTING REVOLUTION
SKYLIGHT INNOVATIONS FUELING THE REVOLUTION

Structural Skylights:

- Beautiful and brings daylight to large spaces in a building
- Products can be pre-fabricated or completely customized for building and occupant need
- Automation available

Notes:

Structural or modular skylights can be combined in a number of skylight configurations, creating perfect solutions for a wide variety of building types: narrow corridors, internal courts, studios, and large circulation spaces. Each roof glazing solution is delivered with a special prefabricated flashing ensuring a perfect fit and 100% water tightness. Venting and blind and shade options with automation are available.

These structural skylights deliver all of the benefits of modularity to skylights and glazing before, during, and after specification. The units are 100% prefabricated, allowing complete control throughout production by building and assembling the skylights in factory. Elements like glass quality, and for automated units, motor power and speed, are designed to work in each unit as a single system.

1.44 Daylighting Revolution - Skylight Innovations Fueling the Revolution

DAYLIGHTING REVOLUTION
SKYLIGHT INNOVATIONS FUELING THE REVOLUTION

Energy efficiency:

- Solar powered (PV) skylights
- Aerogel technology filling for thermal protection and increased insulation
- Smart glass

Notes:

Placement and design are vital to energy savings and sustainability efforts, but so are the actual materials used within any daylighting structure. Modern skylight's advanced glazing technologies and thermal insulation can now provide superior aesthetics with proven performance.

Skylights are an ideal application for photovoltaic glass (PV). They are normally well exposed to the sunlight, allowing for optimal energy yield. PV skylights also improve thermal inner comfort, since most of the UV and infrared radiation are filtered out by the Silicon-based material. Semi-transparent PV glass reduces the need for artificial lighting, generates power, and provides thermal and sound insulation.

Not only glass and acrylic, but new skylight glazing and structural components have improved the impact resistance and UV performance within commercial daylighting structures. Utilizing multiwall polycarbonate panels versus standard glass or acrylic has allowed for superior strength and UV protection (without discoloration or unsightly yellowing side effects) while offering industry-leading thermal performance. To achieve best in class insulation, leading skylights can utilize aerogel technology. Aerogel technology is an eco-friendly insulation that repels water, retains properties under compression, reduces sound and vibration transmission, and provides beautifully diffused daylight to be used in a variety of daylighting applications. This revolutionary material improves the quality of light and design flexibility without compromising design or aesthetics.

An additional advanced glazing option, Electrochromic Glass (or smart glass) electronically tints glass to switch from clear to dark with the click of a button. The glass can be programmed to respond to changing sunlight and heat conditions. Energy consumption and costs are greatly reduced. Electrochromic glass offers significant advantages over conventionally glazed products because they provide the highest possible solar control without sacrificing the view through the glass by obscuring it with shades or shades.

1.45 Daylighting Revolution - Skylight Innovations Fueling the Revolution

Notes:

Advances in technology have also enhanced long-term product performance.

Skylights today include leak-resistant design that includes continuous sill enclosure and weep holes to route condensation to the exterior and safeguard against water intrusion.

Not only reliant on glass and acrylic materials, new skylight glazing and structural components have improved the impact resistance and UV performance within commercial daylighting structures. Utilizing multiwall polycarbonate panels versus standard glass or acrylic allows for superior strength and UV protection (without discoloration or unsightly yellowing side effects) while offering industry-leading thermal performance. Today's translucent wall systems include UV inhibitors and, by utilizing polycarbonate, they eliminate fibers that deteriorate and discolor over time. Using these new materials allow for a no-maintenance facade that maintains its shape, color, and strength, even when exposed to UV light.

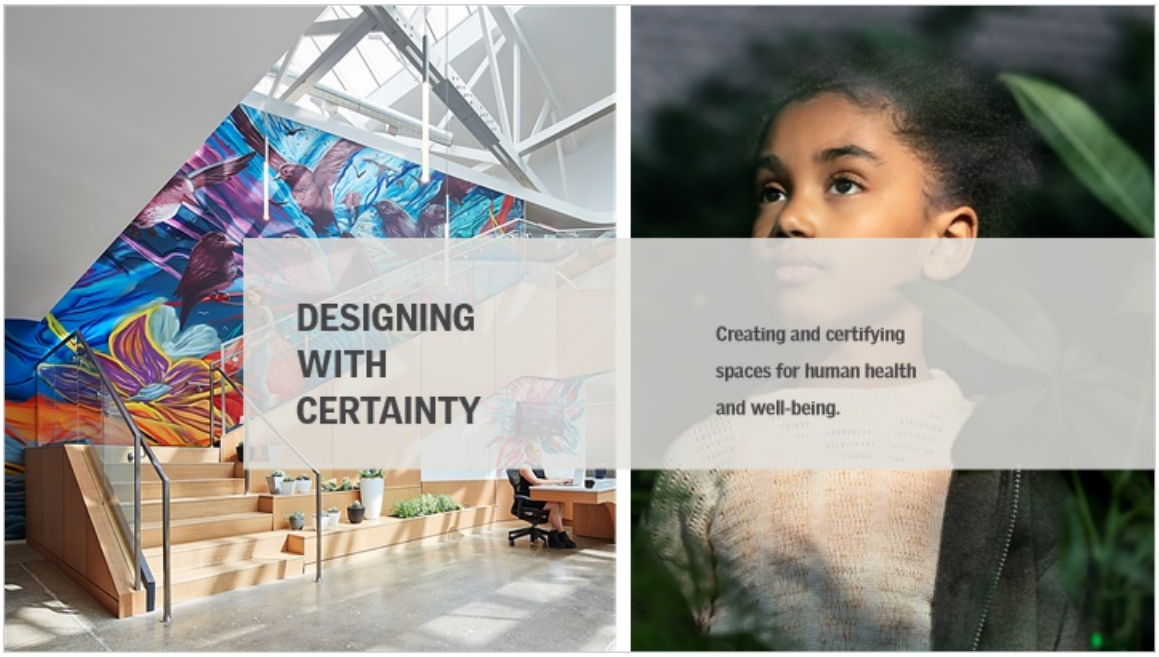
1.46 Designing with Certainty

Notes:

Standards, certifications, and verifications bring the guarantee to any human wellness design strategy. With a more complete understanding of the tools available today via modern skylight technologies, the best tools can be more easily selected and placed in a building in pursuit of a goal.

The WELL Building Standard (WELL) is a roadmap for creating and certifying spaces that advance human health and well-being. It allows design professionals to design with certainty.

1.47 Designing with Certainty



Notes:

Developed over 10 years and backed by the latest scientific research, WELL sets pathways for accomplishing health-first factors that help every one of us to do our best work and be our best selves by supporting our physical and mental health. Rigorous performance standards for design interventions, operational protocols and company-wide practices are verified by a third party. WELL works at any scale, from a single interior space to an entire organization.

1.48 Designing with Certainty

Notes:

WELL Certification is ideal for organizations implementing WELL within a single building or asset. The program helps organizations monitor ongoing building performance and collect employee feedback, enabling them to take a data-driven approach to their health and well-being efforts. Organizations can leverage quantifiable metrics from WELL Certification to advance Environmental, Social and Governance (ESG) reporting efforts.

Projects are required to pursue a certain subset of features or strategies within the 10 WELL concepts, including Air, Water, Thermal Comfort, Light, Movement, Nourishment, Sound, Mind, Community and Materials. In order to demonstrate compliance with program requirements, projects must submit documentation, which is evaluated and tested by a third party. Projects earn points toward their WELL Certification goal with every feature they achieve. Upon achievement, projects receive a plaque indicative of one of four levels of certification based on the total number of points earned.

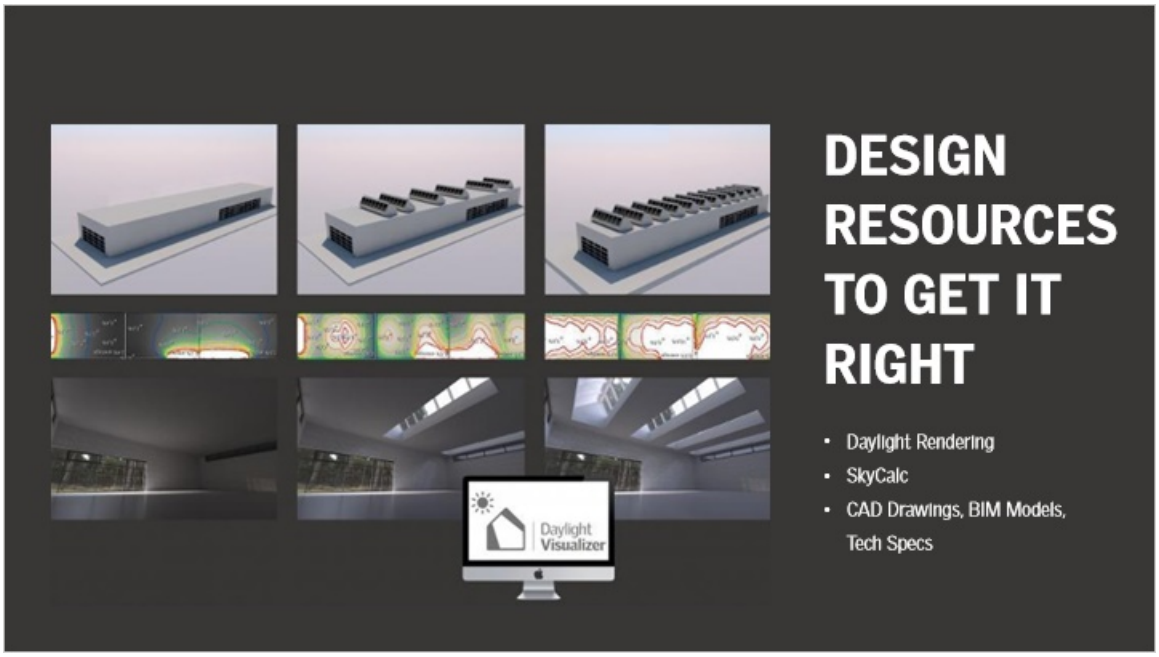
WELL Certified Bronze: 40 points

WELL Certified Silver: 50 points

WELL Certified Gold: 60 points

WELL Certified Platinum: 80 points

1.49 Design Resources to Get it Right



Notes:

In addition to certifications and standards, leading manufacturers and building science organizations offer tools to aid in creating and realizing design goals.

There are multiple design resources available today, allowing the design professional to create with confidence.

Daylight renderings can accurately predict daylight levels and appearance of a space lit with natural light, prior to realization of the building design. The best rendering tools pass all CIE 171:2006 test cases dedicated to natural lighting. These renderings simulate the following aspects of natural light transport with an average error lower than 1.29 %:

- Luminous flux conservation
- Directional transmittance of clear glass
- Light reflection over diffuse surfaces
- Diffuse reflection with internal obstructions
- Sky components, external reflected components, and various opening configurations

These results can be exported into a 3D model for further examination.

Indoor climate visualizers are used by engineers and architects prior to realization of the building design. This tool handles projections of natural ventilation and solar shading well, and calculates indoor air quality, thermal comfort, and overheating.

SkyCalc is a light level estimator for skylights. The Skycalc program was developed by the Heschong Mahone Group to quickly determine the number of skylights needed in order to maximize the energy savings that skylights can provide. Partnering manufacturers will typically provide and fill in as much information as possible. Manufacturers can then forward the result so design professionals can continue to modify the inputs to further refine the energy savings estimate.

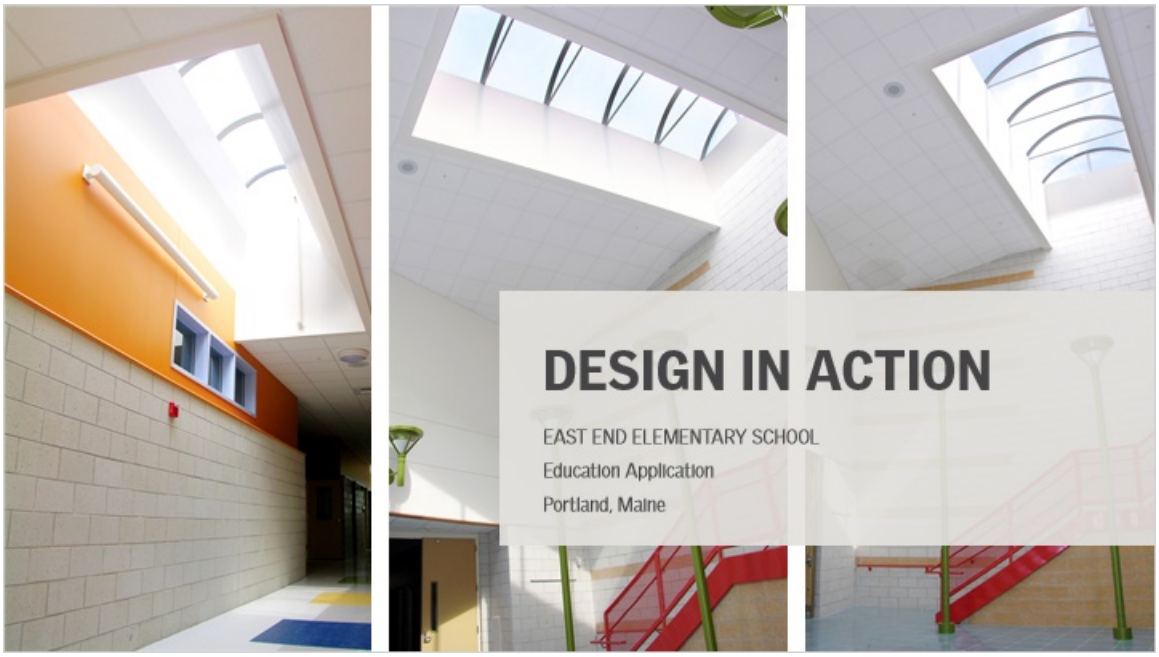
Leading manufacturers will also provide CAD drawings, BIM models, and technical specifications. Dedicated product pages feature BIM objects to use and also typically contain information about the specification of daylight and fresh air to help ensure a healthy indoor climate in your BIM project.

1.50 Video

Notes:

Today's skylights offer tools for the revolution. All of these options are now placed into the hands of the design professional.

1.51 Design in Action



Notes:

This design showcases a new high-performance 73,000 sq ft school, using USGBC LEED-NC rating, to create a beautifully daylit learning environment.

Products & Placement:
Main Lobby: Barrel Vault Skylight System
Cafeteria: Barrel Vault System
Corridor: Barrel Vault
Music Room & Stairwells: Utilized traditional dome unit skylights

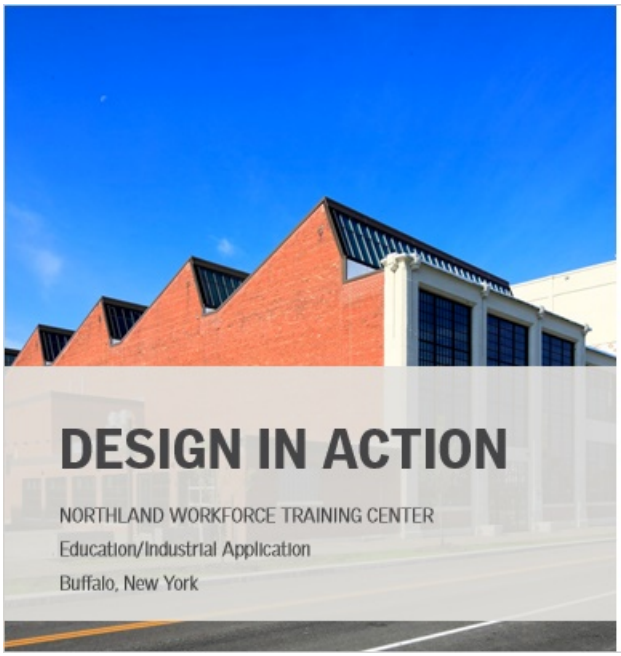
1.52 Design in Action

Notes:

This project involved renovating a former metal foundry in Philadelphia's abandoned navy yards into a beautiful workspace for Urban Outfitters Anthropologie's corporate campus workspace.

Products & Placement:
Two custom large-span skylight systems, running along the central ridgeline of both areas of the building.
Structural Skylight in Ridge Configuration
Structural Skylight in Double Pitch Configuration
Custom tinted glazing system utilizing a combination of low emissivity bronze and clear laminated glass to ensure high daylight transmission without heat gain, glare or fading.

1.53 Design in Action

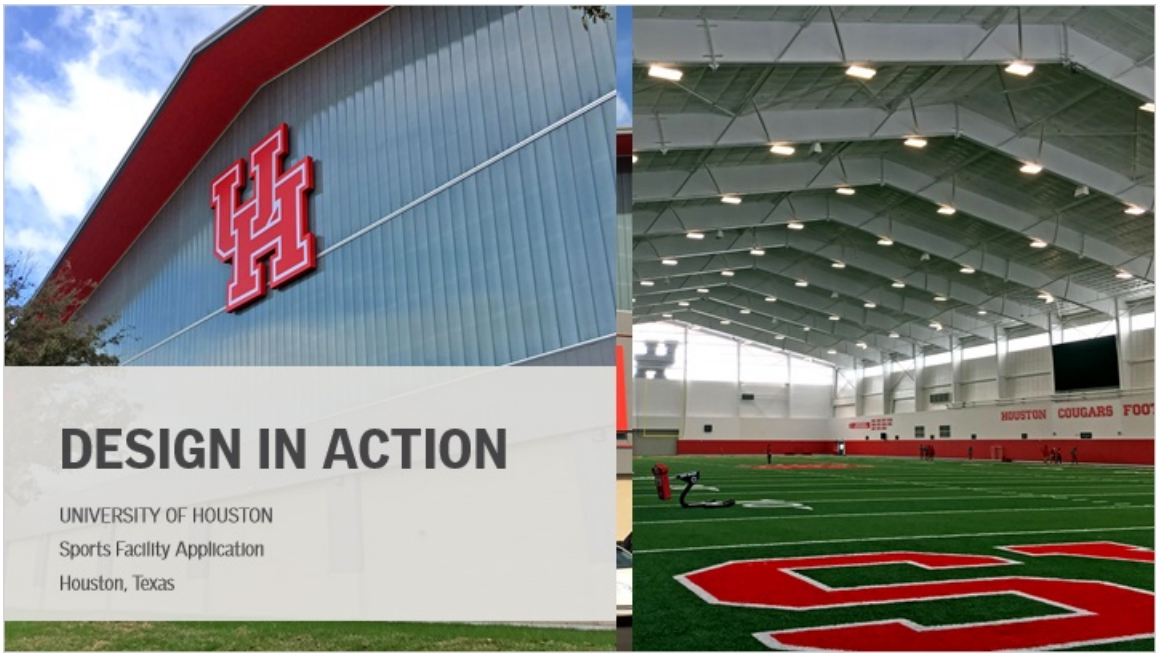


Notes:

Renovating a century old building into a modern training center while maintaining rigid historic preservation requirements and budget. Replacing original skylights and installing an interior canopy system allowed for abundant daylight and superior energy efficiency and climate control.

Products & Placements:
Single and Double Pitch Skylights
Canopy System
Southward facing skylights (which received most direct sunlight) utilized special glazing to reduce solar heat gain while boosting visible light transmittance. The northern-facing skylights (which received less direct sunlight) were glazed with a more economical glazing that still provided high energy efficiency.

1.54 Design in Action

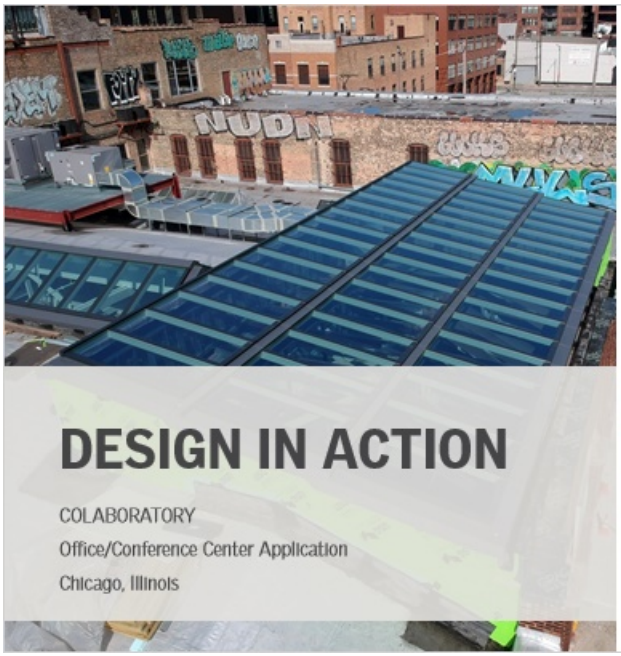


Notes:

The University of Houston Indoor Football Practice Facility is a 106,000 SF pre-engineered metal building over a synthetic turf practice field. Translucent wall panels along the sides and entrance offer superior strength, durability, and diffused daylight throughout the facility.

Product & Placement:
Indoor Football Practice Facility: Multiwall Polycarbonate Translucent Wall System that runs along the wall of the training facility.

1.55 Design in Action

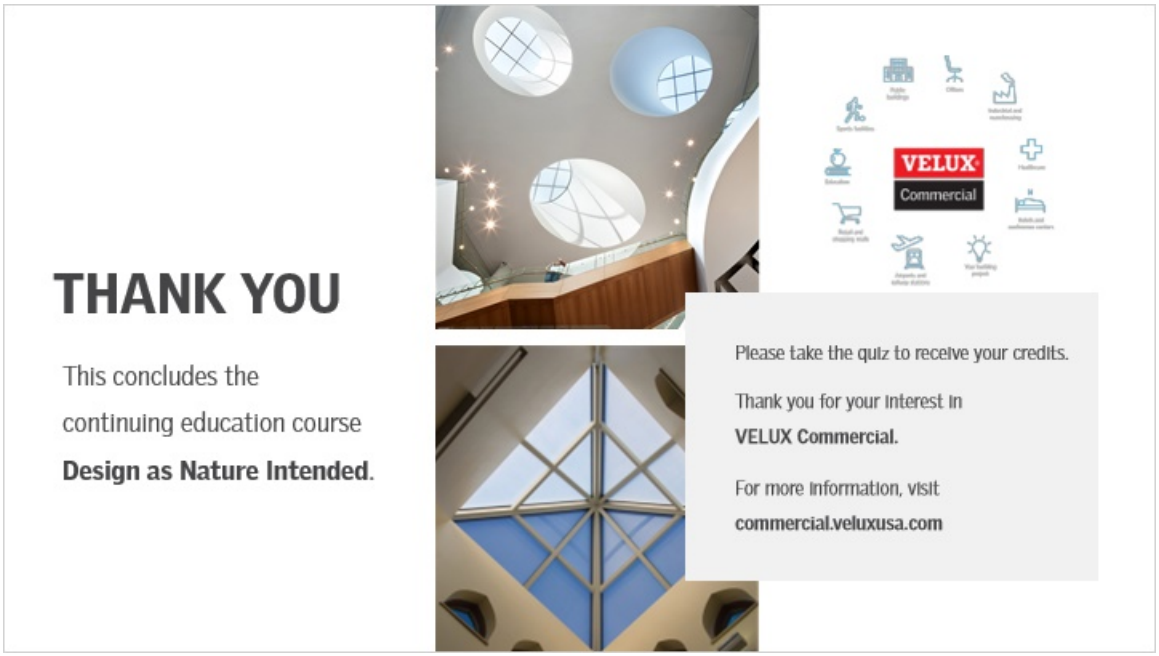


Notes:

This project renovation took a 20,000 sq ft 1916 building, consisting of original bow truss system, and created a daylit work and event space for restaurant and bar professionals that includes a commercial kitchen and bright coworking areas.

Products & Placement:
Lofty Common Area and Bars: Replaced original skylights with two Modular Skylight Systems in a Ridgelight Configuration
Main Atrium: 51 Modular Skylights in Step Longlight Configuration

1.56 Thank You



Notes:

This concludes the continuing education course Design as Nature Intended.