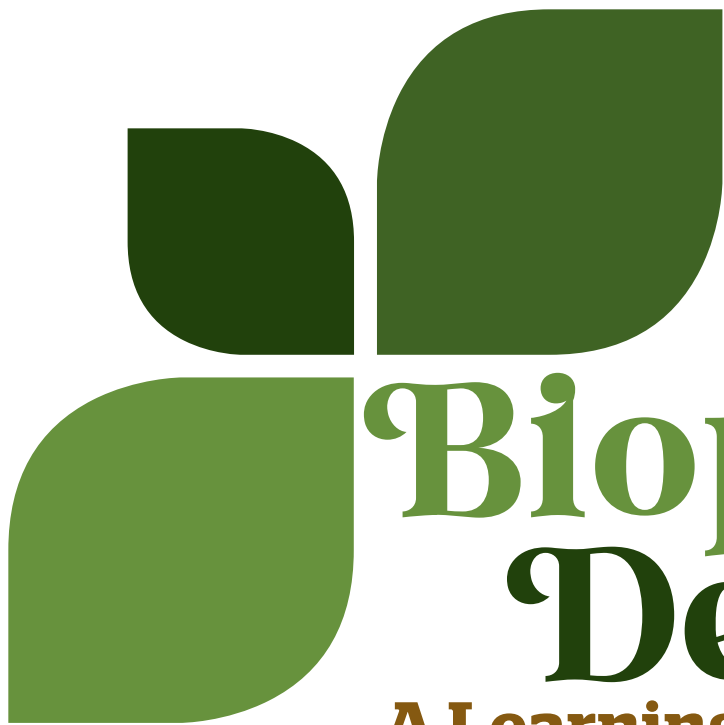




Biophilic Design

A Learning Tool

Connectivity to the outdoors and nature is critical in educational environments. This is particularly important in dense urban schools where student outdoor time is severely limited, as well as in technology-heavy learning settings where students spend 50 to 60 hours in front of a screen per week.

According to the American Academy of Child and Adolescent Psychiatry, “On average, children ages 8-12 in the United States spend 4-6 hours a day watching or using screens, and teens spend up to 9 hours.”

Even with the best intentions, there are many proven negative side effects of screen time such as reduced time outdoors, decreased physical activity, sleep problems, lower grades in school, poor self-image and weight problems.

Biophilic Design

Biophilia is the instinctive and therapeutic bond between human beings and other natural living systems. The word literally translates to “love of life.” Biophilic design in the built environment can happen in a variety of ways that are hierarchical in terms of benefits to occupants:

1. Direct connections to natural landscapes (e.g., gardens, landscaped courtyards, a walking path to a nearby forest)
2. Access to daylight and views of nature
3. Bringing plants (real or faux) inside
4. Figurative translations of nature with man-made materials (e.g., surfaces, textures, lighting and sounds)
5. Abstract translations of nature in patterns, shapes and colors



Educational spaces should function much like a living organism; their design should bond children with nature and provide a learning experience free from constraints of space, technology and energy.

Layering these ideas where most appropriate throughout a building can be a very successful approach. No matter the location of school, the budget or the scope of work, the underlying design challenge with all these methods is to replicate the feeling, rather than the aesthetic, of nature.

Why is Nature in Educational Design Important?

Recent breakthroughs in neuroscience, technology and pedagogy provide new opportunities for architects and designers to redefine educational models and their relation to processes of learning and the natural environment.

Sustainable school buildings should be designed to reinforce our instinctive connection with nature. Educational spaces should function much like a living organism; their design should bond children with nature and provide a learning experience free from constraints of space, technology and energy.

Despite many student learning preferences, the desire and ability to learn from nature is innate in everyone. The natural world offers a curriculum for every grade level from hands-on sensory exploration in early education to STEM programs for upper grades. Most importantly, outdoor education offers freedoms that a school building cannot; it blurs the lines between “play” and “learning.”

Research confirms the many benefits of experiencing real nature and even just seeing images of nature:

- Increases attention span
- Strengthens memory
- Reduces stress
- Improves mood and mental engagement
- Enhances creativity
- Triggers one’s parasympathetic nervous system, which is responsible for bringing the body back to homeostasis

Inspired by Nature: Biophilic Design in Action

Biomorphic Forms & Patterns at Bright Futures Preschool

It's easy to commend educational architecture for its biophilic design when a school is nestled in an idyllic natural setting. But what if such a setting is not an option?

Bright Futures Preschool (Galesburg, IL) exemplifies how to create biophilic experiences for young children when retrofitting a building with few natural connections. In this case, the existing former “big box” retail store-turned-church had little access to natural light and sat amid parking lots and retail facilities.

The new preschool brings nature inside via biomorphic tree forms to not only conceal existing columns but also provide gathering points to extend learning beyond the classrooms. Additionally, natural wood, faux plants and tactile wave-like panels throughout the corridors are simple solutions that offer many benefits of biophilic design.



Photo Credit: AJ Brown Imaging

Visual and Non-Visual Connections to Nature at John Hancock College Prep High School

Urban campuses often struggle with exterior noise intrusion, which can be a source of attention and health issues, reducing occupant well-being. Additionally, connections to nature are often limited but must be prioritized. The biggest challenge of designing John Hancock College Preparatory High School (Chicago, IL) was its location within a residential area neighboring Midway International Airport and a train yard, both of which create loud noises.

The building was designed to wrap around a landscaped courtyard on three sides to create an outdoor gathering area and provide views of nature from within. Acoustic clerestory windows in the gymnasium and above the central learning stair bring in daylight but shield excess noise. The interiors use natural materials such as large aggregate polished concrete flooring and hardwood for the learning stair. The inward, biophilic focus of this school successfully allows students to prioritize learning without the distractions of the airport or train yard noise.

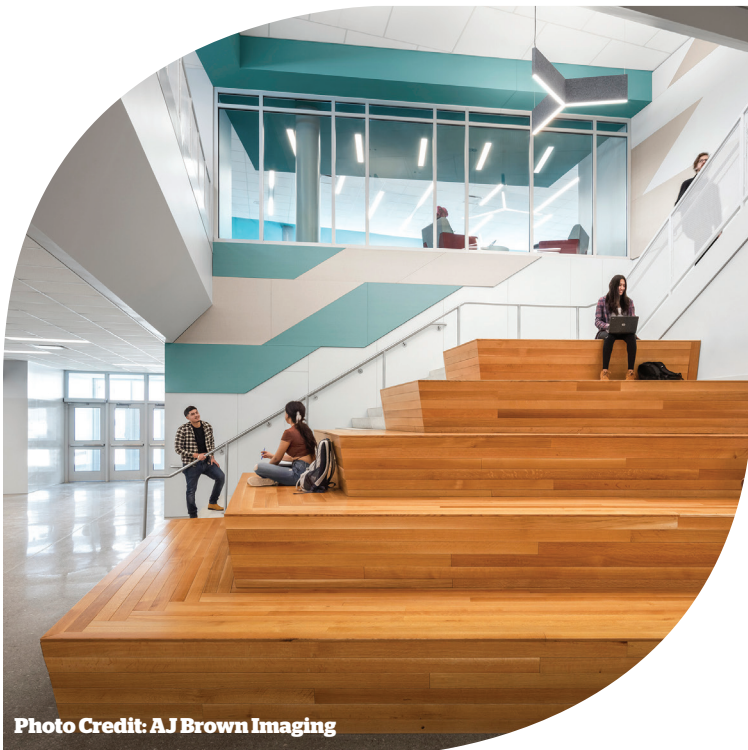


Photo Credit: AJ Brown Imaging

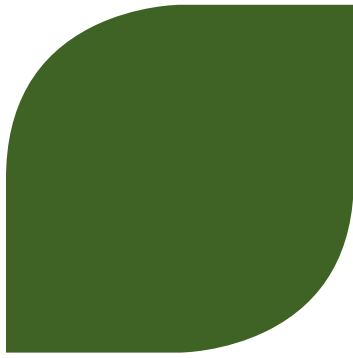


Photo Credit: Connor Steinkamp Photography

Non-Rhythmic Sensory Stimuli/Dynamic & Diffuse Light at Indian Trail Junior High School

The use of natural materials like wood does not alone mean the design is biophilic. A renovation of Indian Trail Junior High School's (Addison, IL) Innovation Center took the school "out of the woods" and "into the light" by removing the dark, dated, wood paneling and adding generous clerestory windows. Biophilic patterning in the flooring and lighting design creates a sense of natural movement throughout the space. Clerestory windows brighten the formerly dark space with diffuse natural light, which changes in color throughout the day from yellow to blue to red. This use of circadian lighting aligns occupants' balance of serotonin and melatonin, which is known to positively impact sleep quality, mood, alertness and other health conditions.

Prospect and Refuge Community Consolidated School District 59 Early Learning Center

For the earliest learners, secure courtyard play spaces offer many benefits of biophilic design including direct access to nature, views of nature and abstract interpretations of nature via play elements. The Community Consolidated School District 59 Early Learning Center (Mount Prospect, IL) puts outdoor learning at the heart of the educational experience with three themed courtyard learning gardens: nature play, sensory play and fine arts. These intimate gardens focus views inward as places of refuge and feature classroom overlooks that allow students to play and explore the courtyards while teachers observe. A larger courtyard for gross motor play takes advantage of a grade level change with a slide and trike track. A sheltered area encourages use even in inclement weather. The spatial patterns of "prospect" and "refuge" recreate natural settings that foster independence and risk-taking in a secure setting.



Photo Credit: AJ Brown Imaging

The First Biophilic Age: A Call to Architects & Administrators

Experts have described our current cultural condition as the “First Biophilic Age.” Designers face the challenge of integrating nature into facilities to compensate for our increasing separation from nature.

This is a call to architects to embrace biophilic design to enhance learning outcomes through better school building design. It’s also a call to school administrators and officials to recognize the immediacy and importance of connecting children to nature.

The examples above demonstrate that biophilic design can take many shapes and forms. A school does not have to be in a picturesque natural setting and built with timber and floor-to-ceiling windows to be considered biophilic. In the Midwest, we can take inspiration from our diverse ecosystems and environments: prairies, forests, wetlands, farms, urban gardens and more. Layering biophilic solutions offers a practical and budget-sensitive way to integrate these settings into our schools and reproduce the feeling of being in nature. And when that happens, students prosper — it’s a natural outcome.

This is a call to architects to embrace biophilic design to enhance learning outcomes through better school building design. It’s also a call to school administrators and officials to recognize the immediacy and importance of connecting children to nature.