



School Building Science Fridays™

Calming The Indoor Environment:
Creating That Just Right Feeling

February 11, 2022

Welcome!



About GBRI



**EDUCATION
PARTNER**



About GBRI



NOT ENROLLED

1 Lesson

New United States Courthouse – A Cas...



Audio Visual 0.5CE General
0.5 LU/HSWs

0% Complete
0/1 Steps



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1 Lesson

LEED Zero: Taking LEED Certified...



Flipbook Article 0.5CE General

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1 Lesson

LEED, LBC, & AIA COTE: Protecting...



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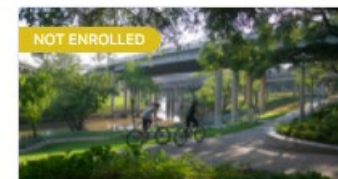
1 Lesson

THE CALIFORNIA ACADEMY OF...



Flipbook Article 0.5CE General

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1 Lesson

LEED for Transit: Rethinking...

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1 Lesson

The Mundo Verde at Cook Campus – A...



Audio Visual 1CE General
1 LU

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1 Lesson

Frick Environmental Center – A Case...



Audio Visual 0.5CE General
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Data Centers & Sustainability:...



Flipbook Article 0.5CE

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Green Roofs: Everything You Need...



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1 Lesson

San Francisco Art Institute Fort Myers ...



Audio Visual 1CE general
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1 Lesson

Cochin International Airport: World's first...



Flipbook Article 0.5CE General
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1 Lesson

Coastal Resilience Part 1: Troubled...



Audio Visual 0.5CE General
0.5 LU/HSW

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0/3 Steps



FREE

1 Lesson

Mindfulness, Meditation and...

Flipbook Article 1CE General
1 LU

0% Complete
0/1 Steps



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1 Lesson

REACHING NIRVANA: THE CASE STUDY O...



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Learn More: www.gbrionline.org/scholarship/

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February 16 2022



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GBRI CLIMATE CHANGE GAMES ARE HERE!

16TH FEBRUARY 2022

12:00 PM ET

3 LEVELS | 4 BADGES



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Continuing
Education**

Approved for 1 HSW LU

Green Building Research Institute
Provider Number: 40119134

A certificate of completion will be sent via email within 24 hours of today's session.



With Gratitude to Our Sponsors



HEALTHY
SCHOOLS
NETWORK





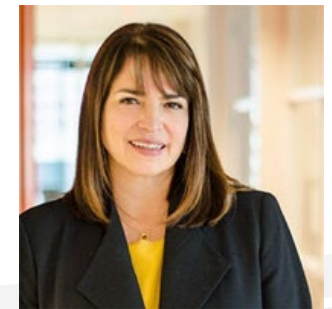
Housekeeping

- Reminder: This session is being recorded.
- Post questions at any time in Q&A box and comments at any time in Chat box.
- Please stay on mute and turn off your video.
- Recording and slides will be emailed to registrants and will be available on-demand on both CHPS and GBRI websites.
- Resources at end of deck for further learning.



Today's Webinar

- Welcome & Introduction: Elisabeth Krautscheid, CHPS
- Speaker Presentations:
 - Aaron Jobson, Partner & CEO, QKA, aaronj@qka.com
 - Irene Nigaglioni, President, IN2 Architecture, irene@in2arch.com
- Audience Questions





Our Mission

CHPS aspires to
make every school
an ideal place to
learn

<https://chps.net>



Our Values

- All schools can be high performance
- Schools are unique environments
- Working collaboratively produces the best results for our schools and students
- High performance schools bring real benefits
 - Healthier teachers and students
 - Better student performance
 - Reduced operating costs





Our Impact

- Over **700** schools have been recognized as meeting the CHPS Criteria
- CHPS Criteria is in use in **14** states and has been adopted as the construction standard in over **60** public school districts.

Chartwell – Seaside, CA

What Is *School Building Science*?

- The body of knowledge that informs the design, construction, operations, and occupancy of school buildings for the benefit of students, educators, staff, and the environment.
- The body of knowledge about the built environment that impacts how children learn and thrive.



Mapleton Adventure School – Mapleton, CO



Learning Objectives



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Education**

1. Identify the built environment stressors on users, especially those with trauma, sensory processing disorder, and anxiety or other emotional disorders.
2. Define the characteristics and qualities of a high performance school.
3. List the attributes of the built environment that positively impact learning and user experience.
4. Assess existing schools and determine changes and alterations needed to improve the environment for users, incorporating the high performance schools criteria.



What does it mean to calm a space?

The Goldilocks Principle:

not too hot, not too cold, not too big, not too small...



Characteristics that inform us

Trauma or Anxiety

- Emotional outbursts or trouble paying attention when environmental conditions change or during a perceived threat
- Trouble relating to others or being near others
- Fear of certain spaces, like long corridors
- Crave quiet, alone time
- Fear of dim spaces

Sensory Processing

- Overstimulated by light, sound, temperature, or smells
- Disrupted when the environment changes
- Disrupted upon seeing visual textures or certain colors
- Overstimulated in crowded, loud spaces like cafeterias or gymnasiums
- Tendency to bump into things or to touch things
- Need to move or seek out stimulation



Who benefits?

Everyone!

Especially those with trauma, sensory processing disorder, and anxiety or other emotional disorder.

When we design for the sensitive ones, we benefit all.

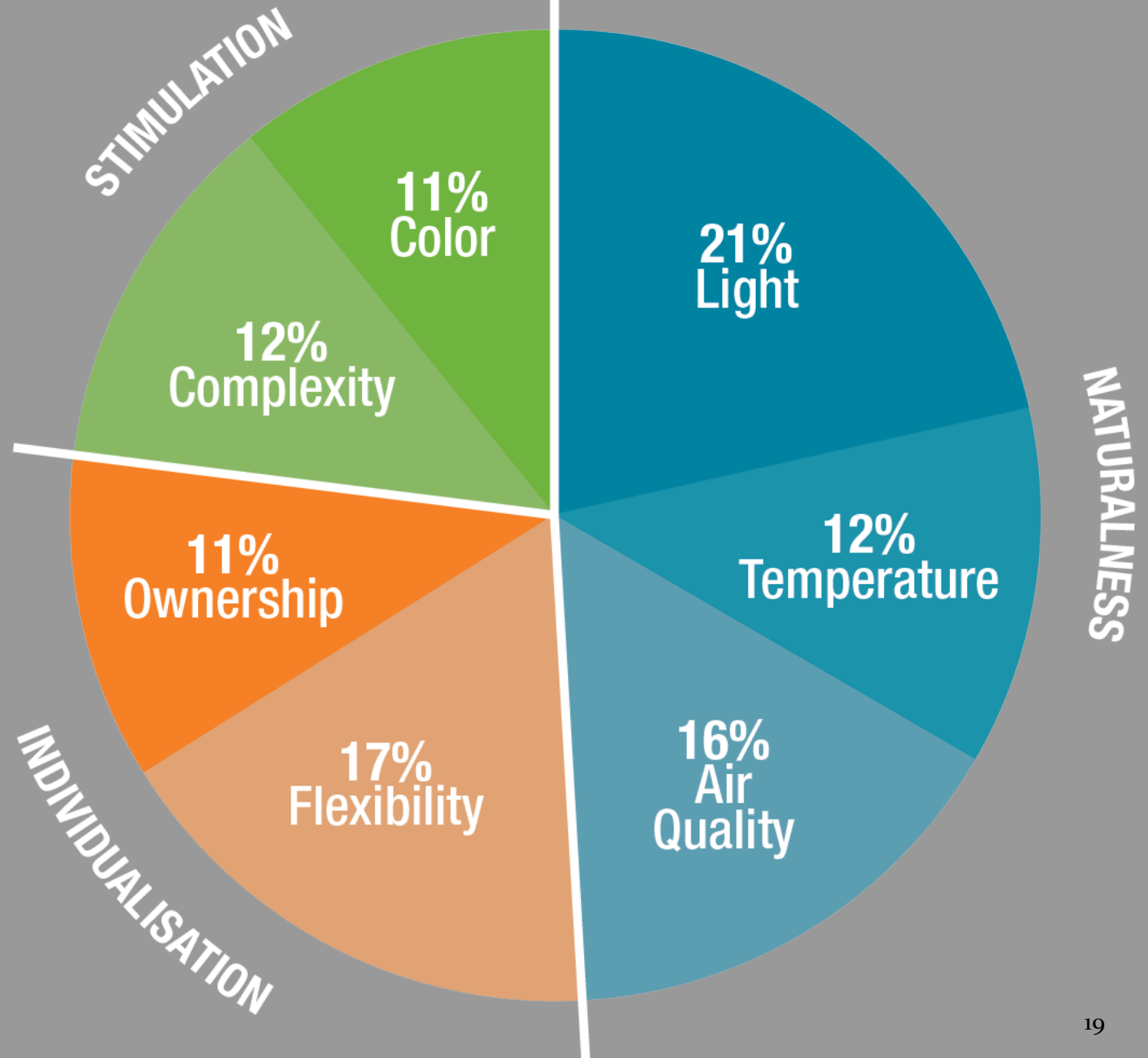
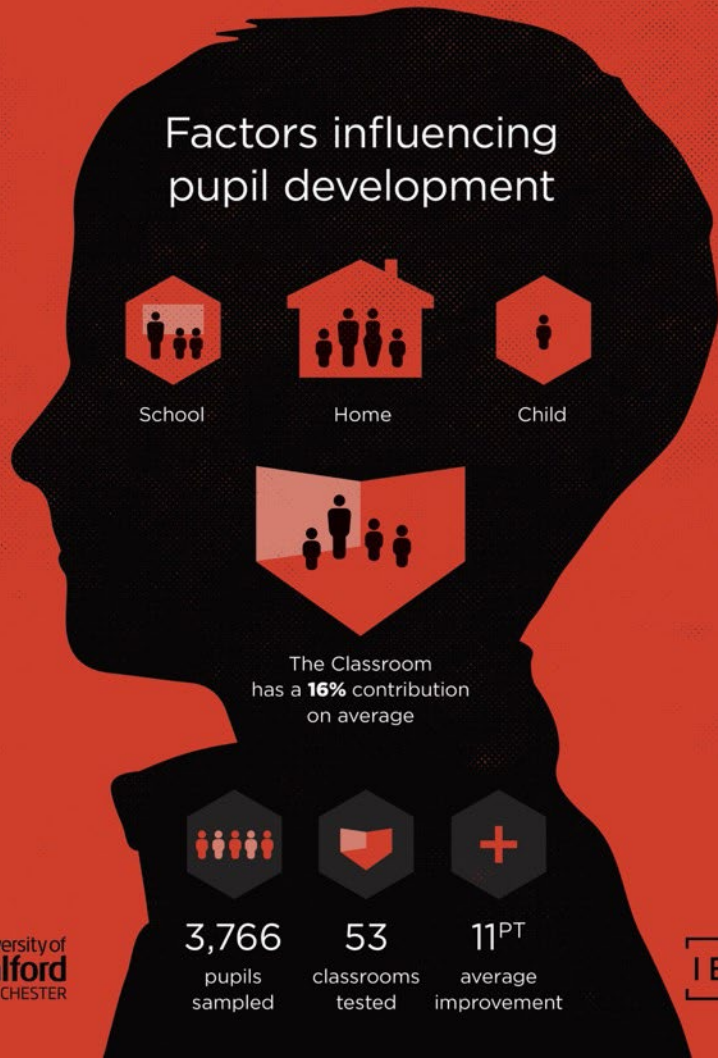


High Performance = Low Stress

- Indoor Air Quality (IAQ)
- Ventilation
- Acoustics
- Volatile Organic Compounds (VOC)
- Temperature
- Views to nature
- Daylight and lighting
- Safety and Security



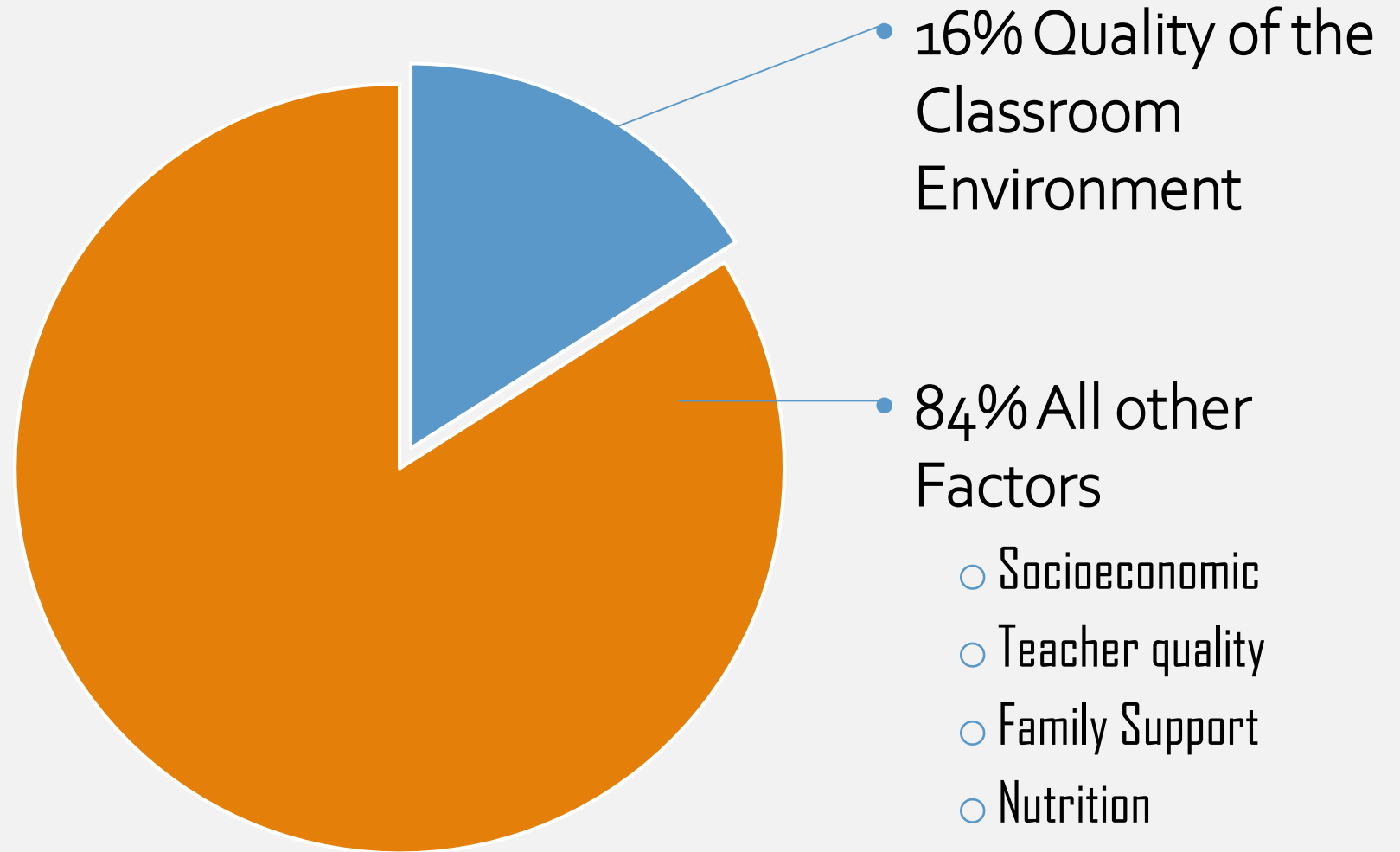
SENSORY IMPACTS ON LEARNING



<http://usir.salford.ac.uk/id/eprint/35221/>

0.65

Impact, in grade levels, of moving an average child from the worst classroom to the best

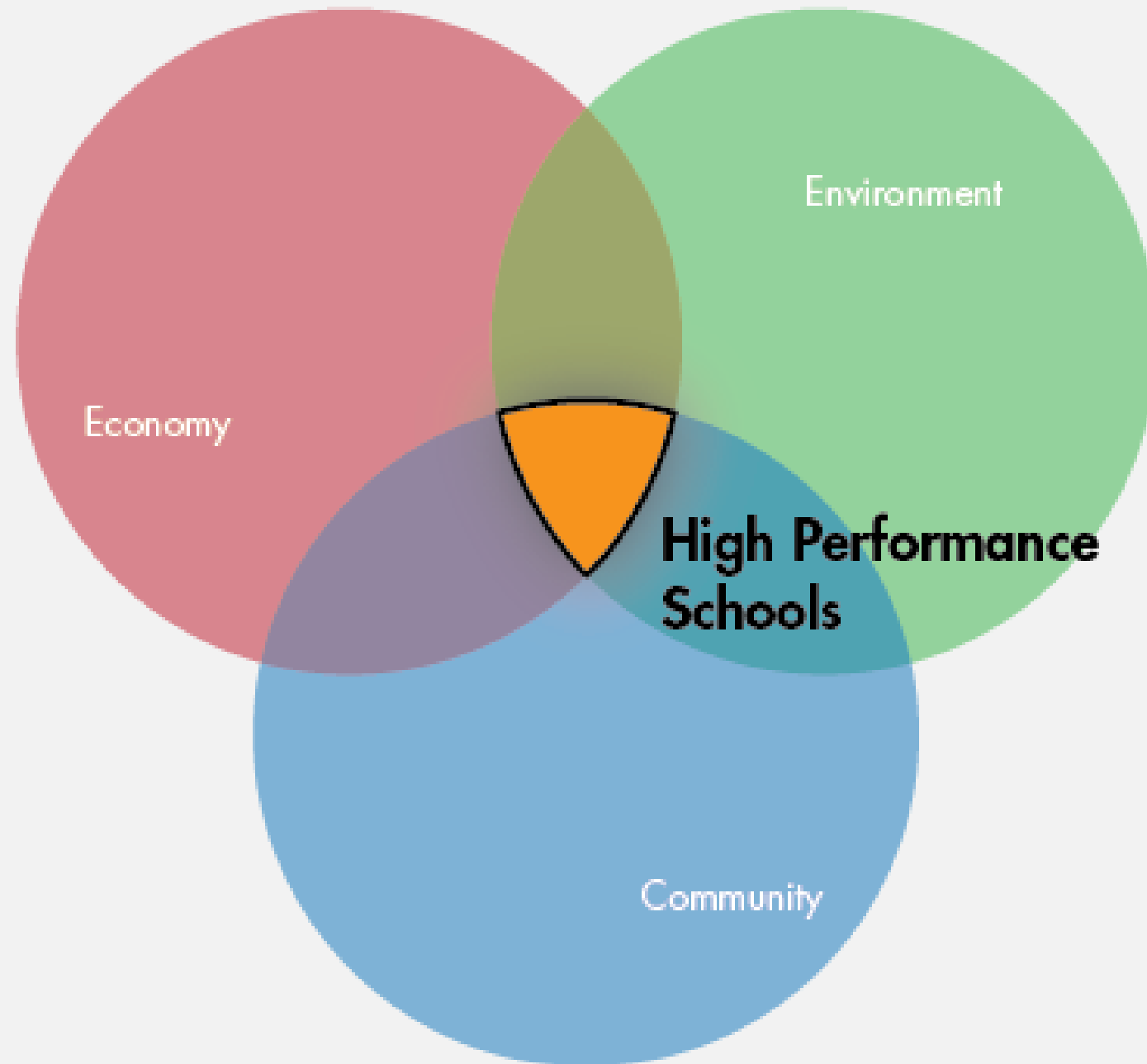


Academic Achievement

Factors affecting the gap between the highest and lowest achieving students.



Daylighting and Lighting



Balanced Daylight

- Multiple sources of daylight
- Light spread even throughout the room
- Skylights and Clerestory windows with translucent glazing





Glare Control

- Critical for effective daylighting
- Important for comfort and reducing stress factors
- Starts with exterior shading techniques
- Supplement with blinds/shades for difficult orientations and times
- Shades also important for security



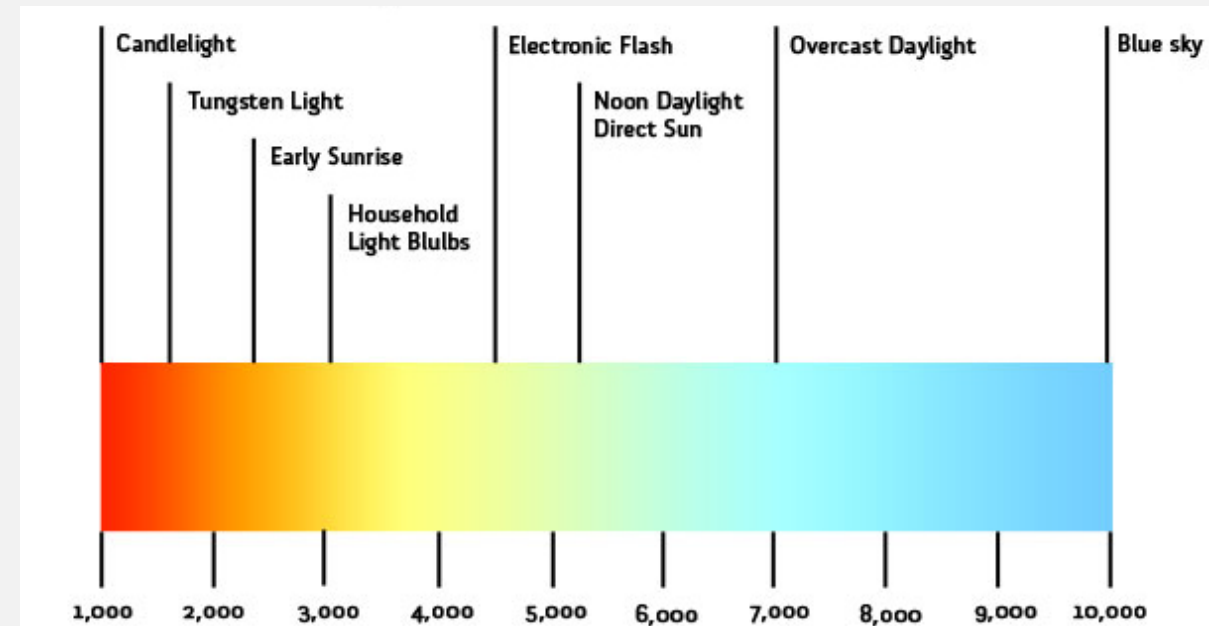
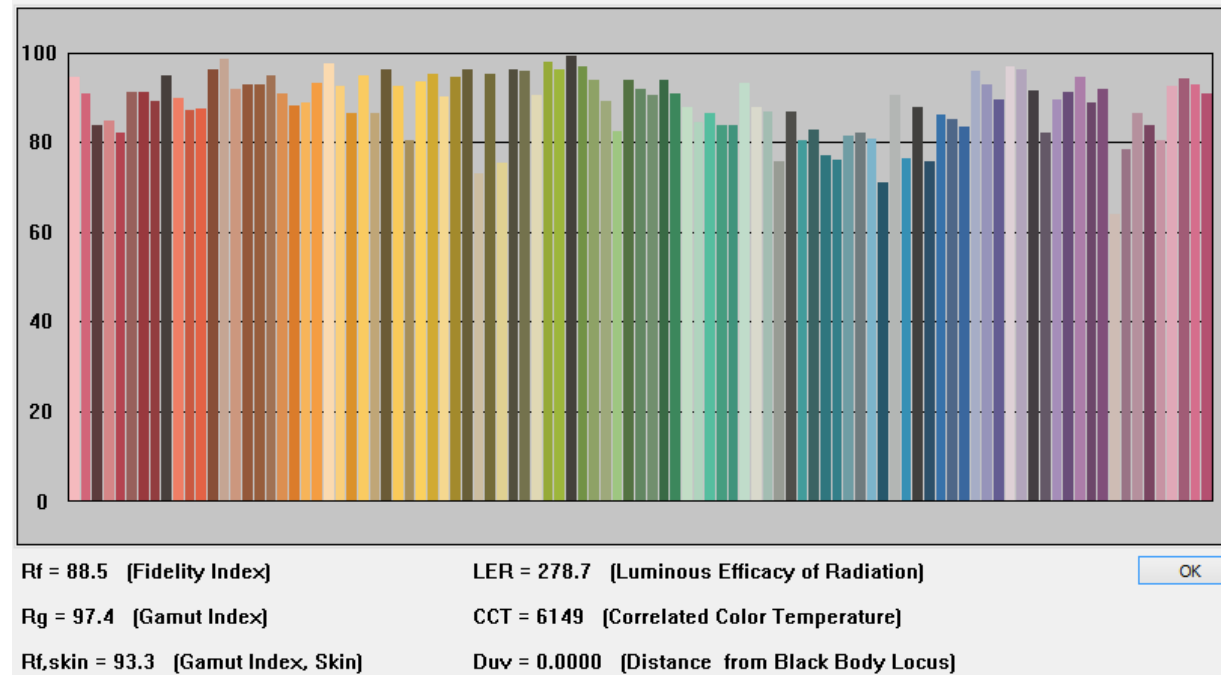
Smart Electric Lighting

- Uniform diffuse light across the workspaces
- Avoid areas of high contrast and glare
- LED fixtures
- Linear, direct-indirect in classrooms
- Daylight harvesting and occupancy controls
- Teacher control

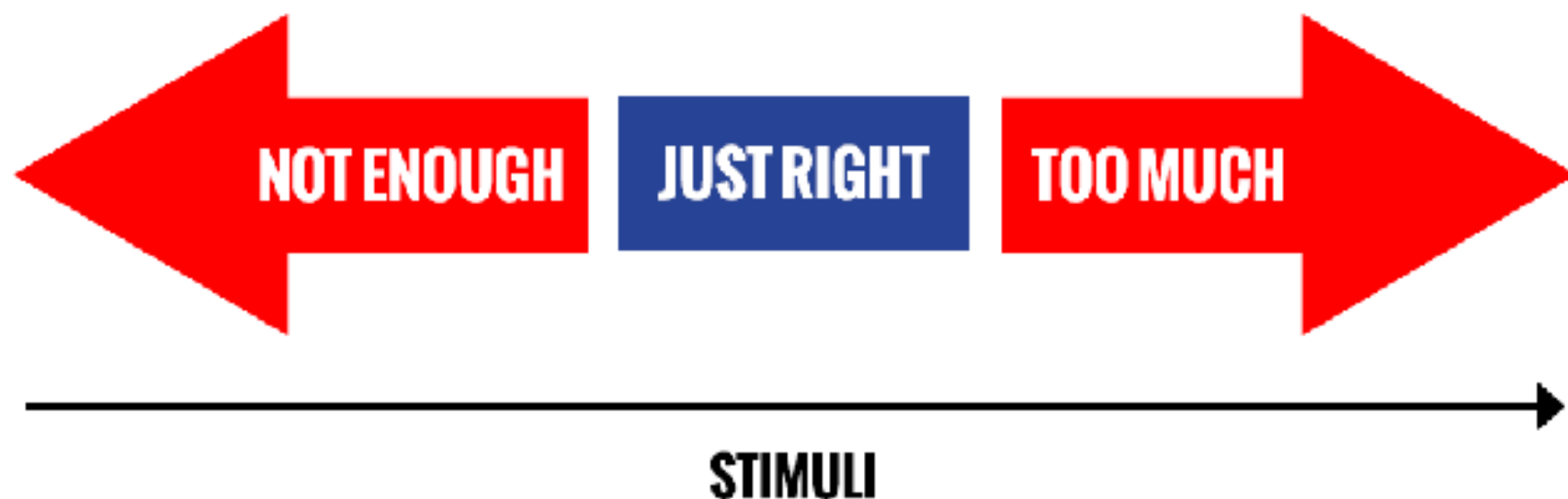


Lighting Quality

- Impacts brain and alertness as well as stress factors
- Color Rendition of light source as measured by the IES TM-30-15 standard
- Affects how colors are viewed and perceived
- Select fixtures that minimize flicker
- Circadian Lighting: adjust temperature and level of lighting to match needs of students and mimic natural light patterns



THE GOLDILOCKS PRINCIPLE





Responsive Design



The enjoyment of scenery employs the mind without fatigue and yet it exercises it, tranquilizes it and yet enlivens it.

Frederick Law Olmstead, 1865

Responsive Design

- Most school buildings are institutional and can create undue stress in staff and students.





Responsive Design

“As humans, we first learn how to survive, so our natural instinct is to study a space, locate ourselves within that space, and then define what our safe space or home base is.”

Cognitive Architecture



Responsive Design

LEARNING

- Direct attention is energy intensive and mentally draining.
- Students experience stress in school due to high expectations of success and trying to make social connections
- When stressed, learning cannot happen.



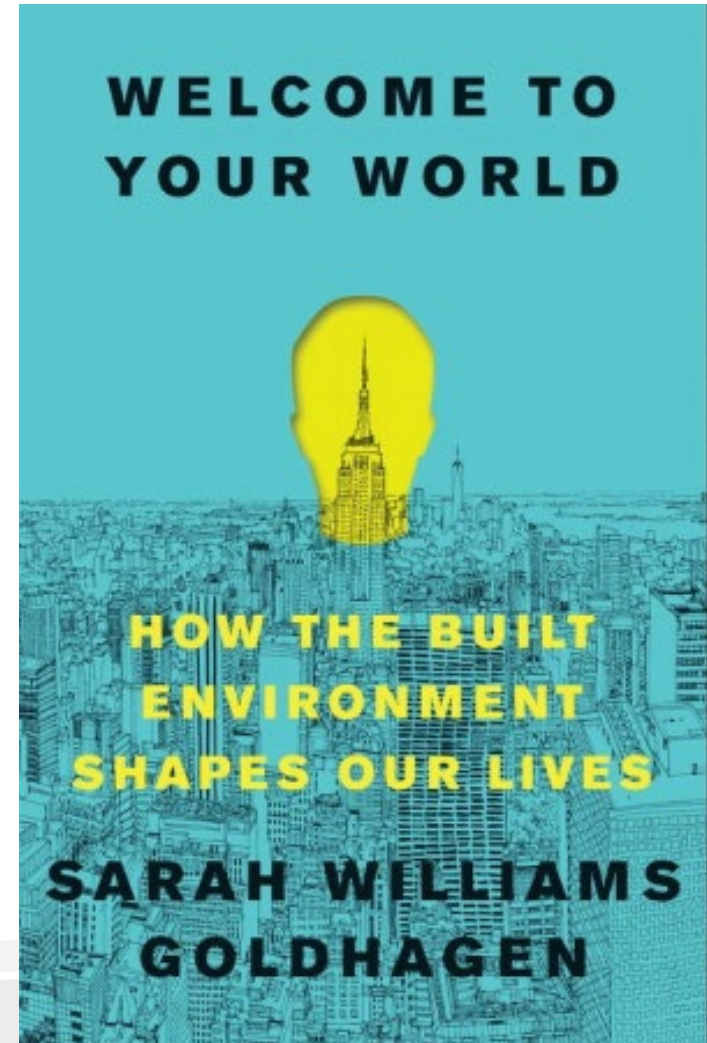
WHOLE CHILD

Responsive Design

“There’s no such thing as a “neutral” environment: your built environment is either helping you, or it’s hurting you.”

“...most of our experiences in the built environment are nonconscious. I use that word quite specifically. It’s not unconscious, because that suggests something that we’d be unable to access. Nonconscious refers to cognitions that we could access consciously, but mostly don’t.”

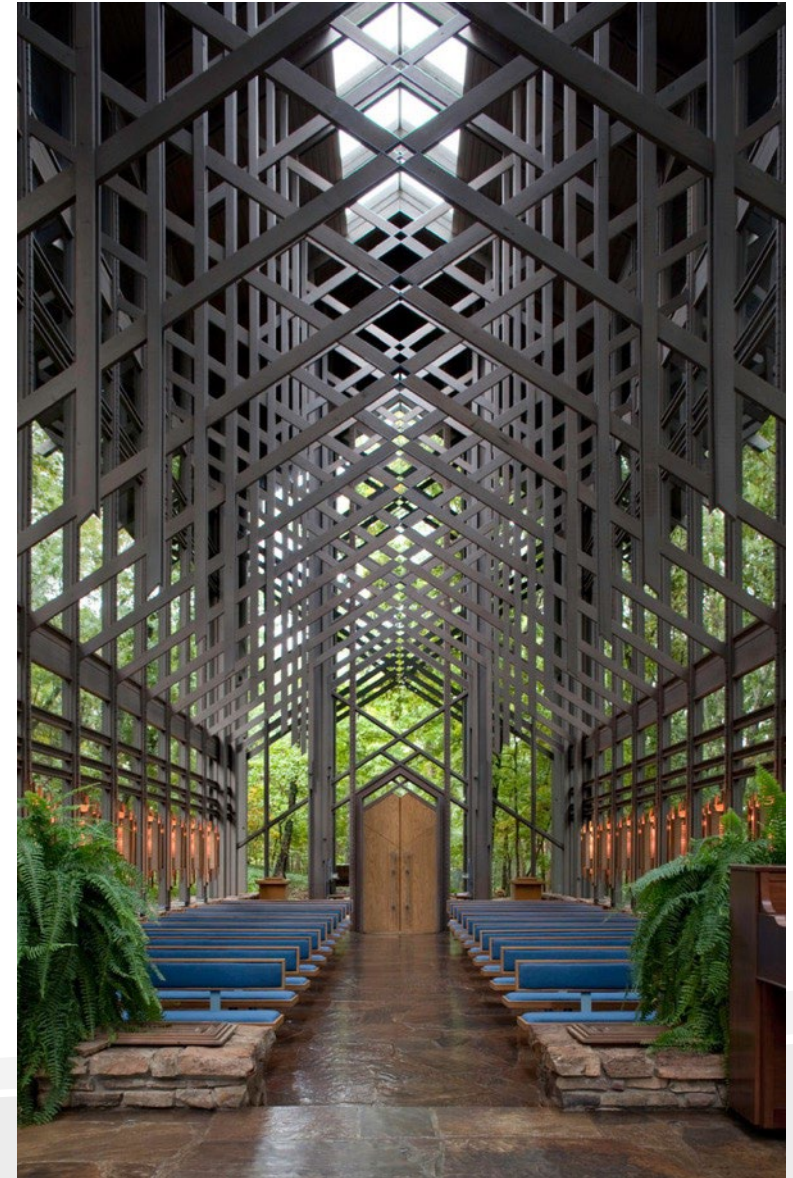
Sarah Williams Goldhagen



Responsive Design

EVIDENCE BASED DESIGN

- Intentional Architectural Design
 - Brain Activating
 - Shapes, Colors & Patterns
 - Beauty and Awe
 - Safe and Secure
 - Inclusive
 - Sense of Community
 - Biophilic Design



Thorncrowne Chapel, Arkansas

Responsive Design

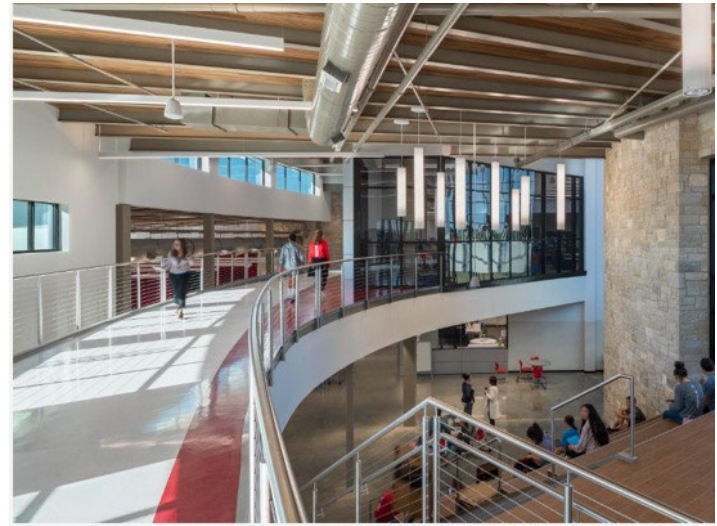


Responsive Design

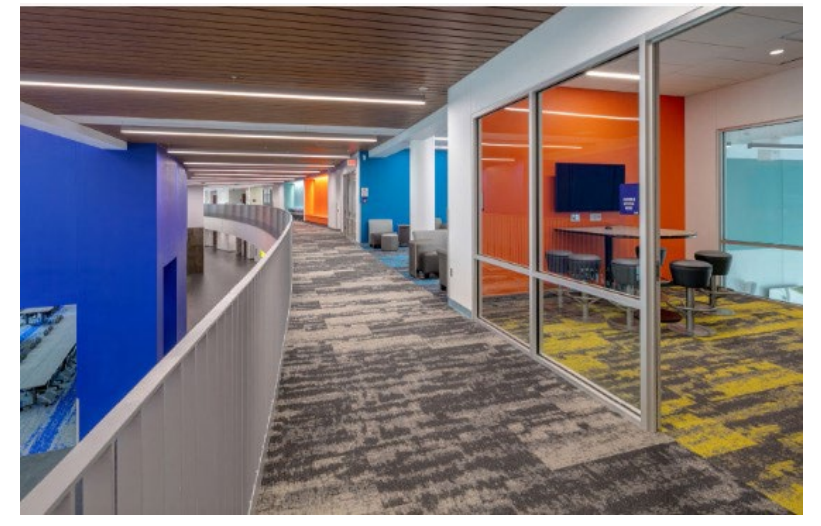
Brain Activating



Shapes, Colors & Patterns



Beauty and Awe



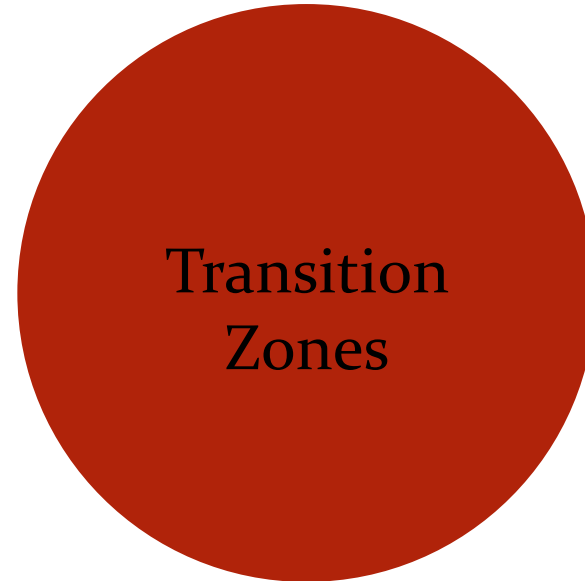


Responsive Design

Safe and Secure



Inclusive



Sense of Community



Responsive Design

Safe and Secure

Inclusive

Sense of Community



Mentoring
Zones

Responsive Design

Safe and Secure



Inclusive



Sense of Community



Transition Zones



Responsive Design

Biophilic Design

- Design of buildings inspired by nature.
- **Neurological nourishment** depends upon engagement with information and its organization.
- 14 Patterns
 - Visual Connection with Nature
 - Non-Visual Connection with Nature
 - Non-Rhythmic Sensory Stimuli
 - Thermal & Airflow Variability
 - Presence of Water
 - Dynamic & Diffuse Light
 - Connection with Natural Systems
 - Biomorphic Forms & Patterns
 - Material Connection with Nature
 - Complexity & Order
 - Prospect
 - Refuge
 - Mystery
 - Risk/Peril



Recovery
Zones

Responsive Design

Biophilic Design



Recovery
Zones

Responsive Design

Biophilic Design



Recovery
Zones

Thank you!





Audience Questions

Please type your questions in Q&A box.





For More Information on Today's Topic

- CHPS Knowledge Library: <https://chps.net/knowledge-library>
- CHPS Construction Criteria: <https://chps.net/chps-criteria>
- CHPS Credit II C8.1 Biophilic & Responsive Design: https://chps.net/integration-innovation#II_C8.1
- NAC Architecture publication *Designing for Special Education*:
<https://www.nacarchitecture.com/publications/DesignForSpecialEducation.pdf>
- Teacher Magazine (Australia) article on biophilia: https://www.teachermagazine.com/au_en/articles/learning-spaces-biophilic-design-in-schools



For More Information on CHPS

<https://chps.net>

- Studies & reports on high performance schools: <https://chps.net/knowledge-library>
- School Building Science Fridays Webinars: <https://chps.net/school-building-science-fridays>
- Our Criteria for New Construction & Major Renovation: <https://chps.net/chps-criteria>
- Membership info: <https://chps.net/join-us>



Thank you to Aaron and Irene.

Thank you all for joining us today!

Please join us for the next free session in our
School Building Science Fridays series:

Drinking Water Safety & Overall Health
March 11, 2pm Eastern

Watch for registration link here: <https://chps.net/school-building-science-fridays>



Join Us for A Special Webinar

Thursday, February 17, 11:00 am Eastern

Designing Schools with Mental Health in Mind,
a presentation by Claire Latané, author of *Schools That Heal*

Info & registration:

<https://www.gbrionline.org/schools-that-heal-design-with-mental-health-in-mind/>