

Color + Light in K-12 Design

SHAPING MINDS THROUGH SPACE



**SHERWIN
WILLIAMS**

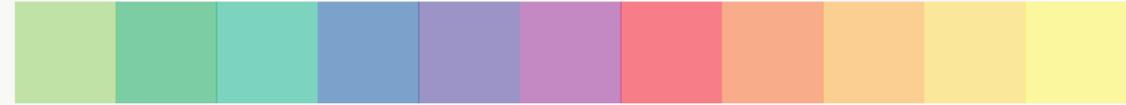
MCHARRYASSOCIATES



Learning Objectives

An exploration of how color and light influence learning, behavior, and well-being in K–12 environments.

1. **Human Impact:** Identify the psychological and physiological impacts of color and daylight
2. **Visual Comfort:** Evaluate how glazing strategies and daylighting design contribute to visual comfort and attention
3. **Identity & Equity:** Analyze case studies where colorful paint, murals, and finishes promote student engagement and school identity
4. **Evidence-Based Theory:** Apply color theory and evidence-based design principles to future educational design projects to enhance learning outcomes.



Why are we here today?



Overview

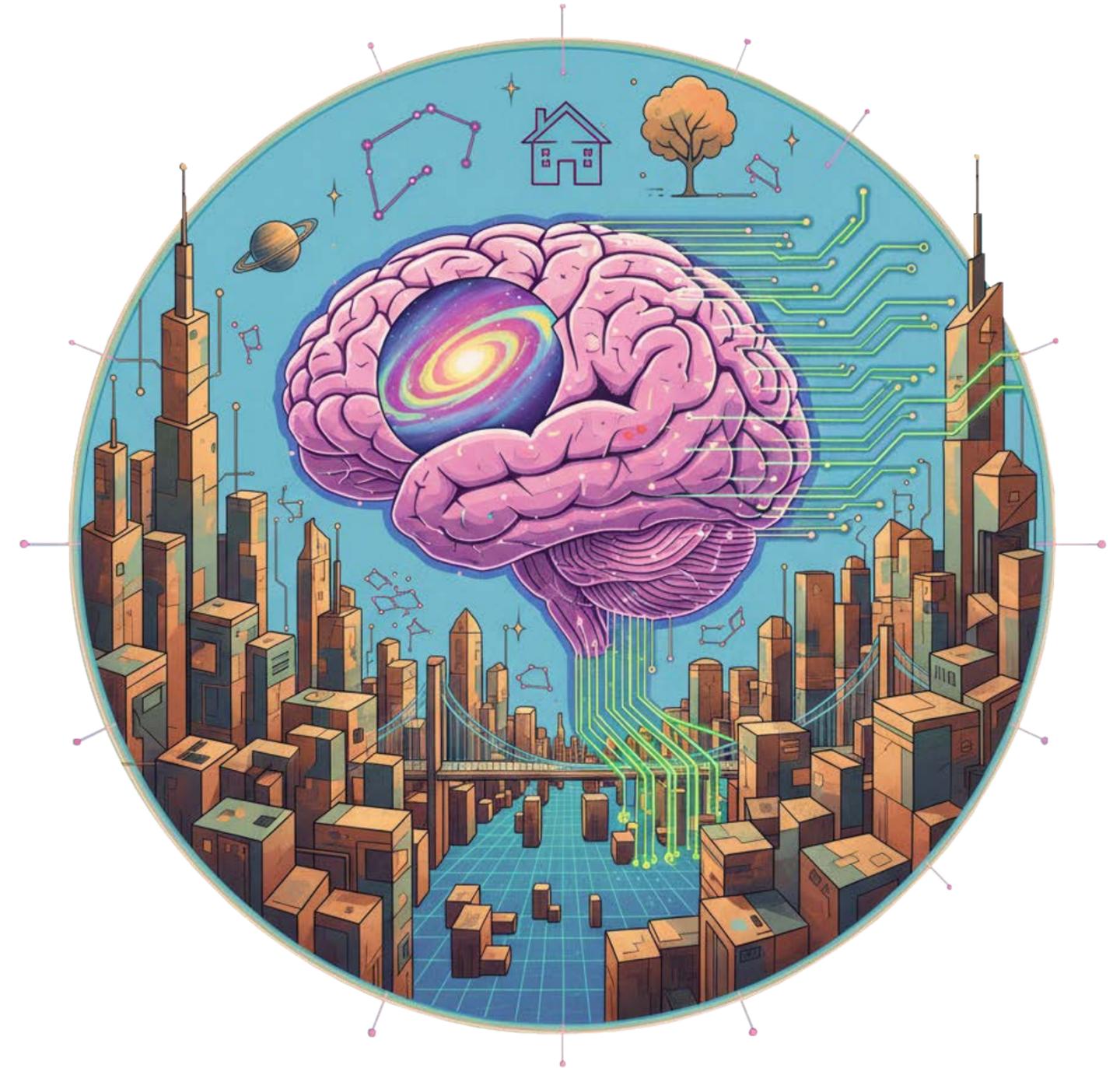
1. The brain-space connection
2. Light and circadian rhythms
3. Color!
4. Storytelling through murals
5. Case Studies



1

Brain-space connection

The interaction between people and their environment



The Context

\$90B

The average annual gap between what districts are spending on their facilities and what is needed *

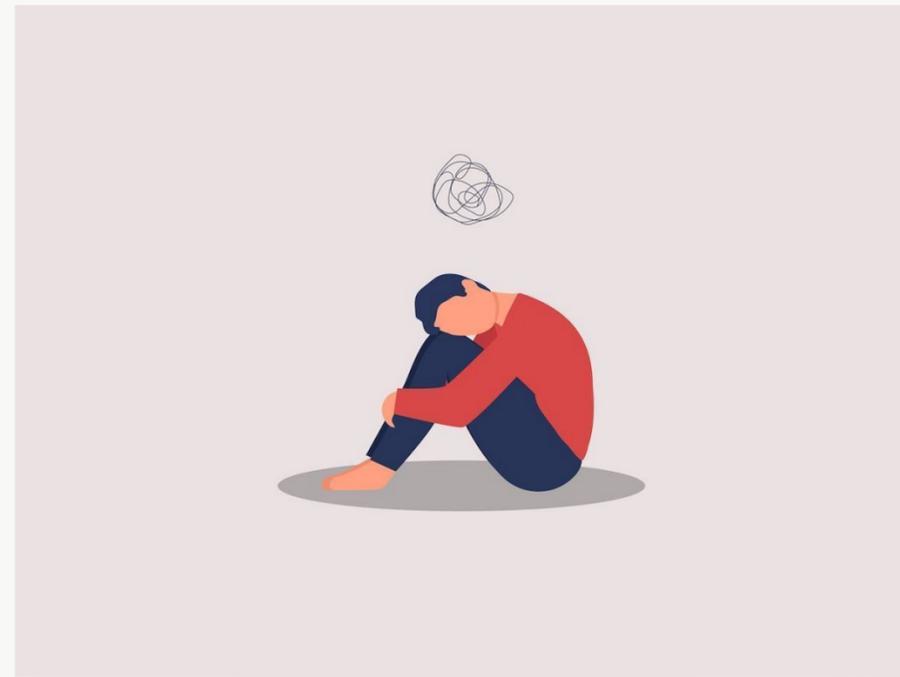
	2016 State of Our Schools	2021 State of Our Schools	2025 State of Our Schools
Facilities Capital Investment Standard - 4% CRV	\$76,800,000,000	\$111,132,000,000	\$138,411,520,000
Capital Actual Annual Avg Expenditure (FY2014-2023)	\$49,000,000,000	\$54,000,000,000	\$82,389,474,317
Capital Gap	-\$27,800,000,000	-\$57,132,000,000	-\$56,022,045,683
M&O Standard - 3% CRV	\$57,600,000,000	\$83,349,000,000	\$103,808,640,000
M&O Actual Annual Avg Expenditure (FY2019-2023)	\$46,000,000,000	\$56,000,000,000	\$70,033,299,166
M&O Gap	-\$11,600,000,000	-\$27,349,000,000	-\$33,775,340,834
TOTAL Annual Avg Facilities Gap	-\$39,400,000,000	-\$84,481,000,000	-\$89,797,386,517

*2025 State of Our Schools
America's PK-12 Public School Facilities

The Invisible Context



Fragmented Attention



Increased Stress



Social Isolation / Loneliness



15,000 hours

the total amount of time spent in K-12 school

The Underlying Truth

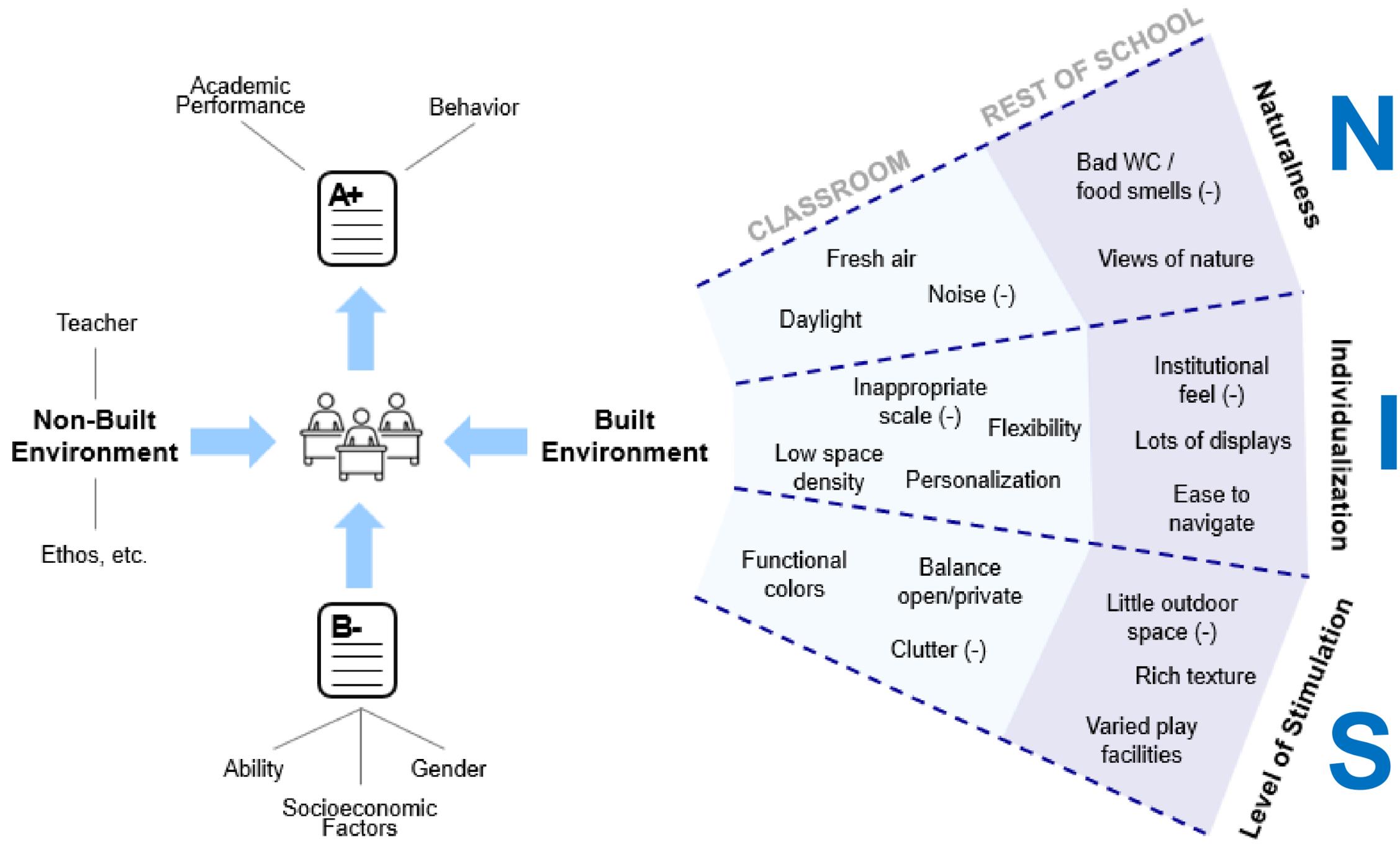
**our built environment
impacts our health
and wellbeing**



schools are
multi-sensory
environments



The 3 Pillars of the Built Environment



*HEAD research design
 The impact of classroom design on pupils' learning: final results of a holistic, multi-level analysis. www.sciencedirect.com

What students experience affects how:



- **safe** they feel
- **alert** they remain
- **focused** they are

Designing for Life Themes



Health & Wellbeing



Safety & Security



Comfort & Accessibility



Connection & Belonging



Learning & Exploration



Creativity & Expression



Skills & Productivity



Purpose & Meaning



Joy & Recreation



Agency & Autonomy



Place Attachment



Ecological Health

*Designing for Life, Center for Conscious Design

Artificial Light

View of Nature

Natural Light

Tactile Surfaces

Soft Flooring

Flexible Seating



built environment as
a stage for learning

built environment as
an active participant

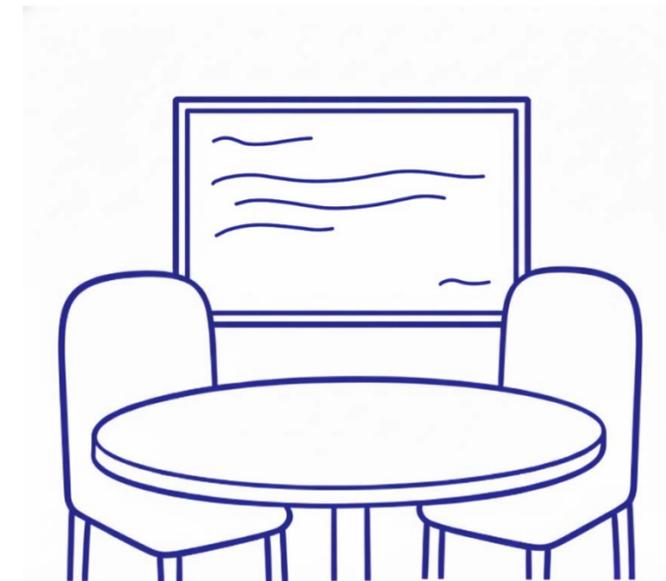
The 3 Teachers



**1st
Teacher**



**2nd
Peers**



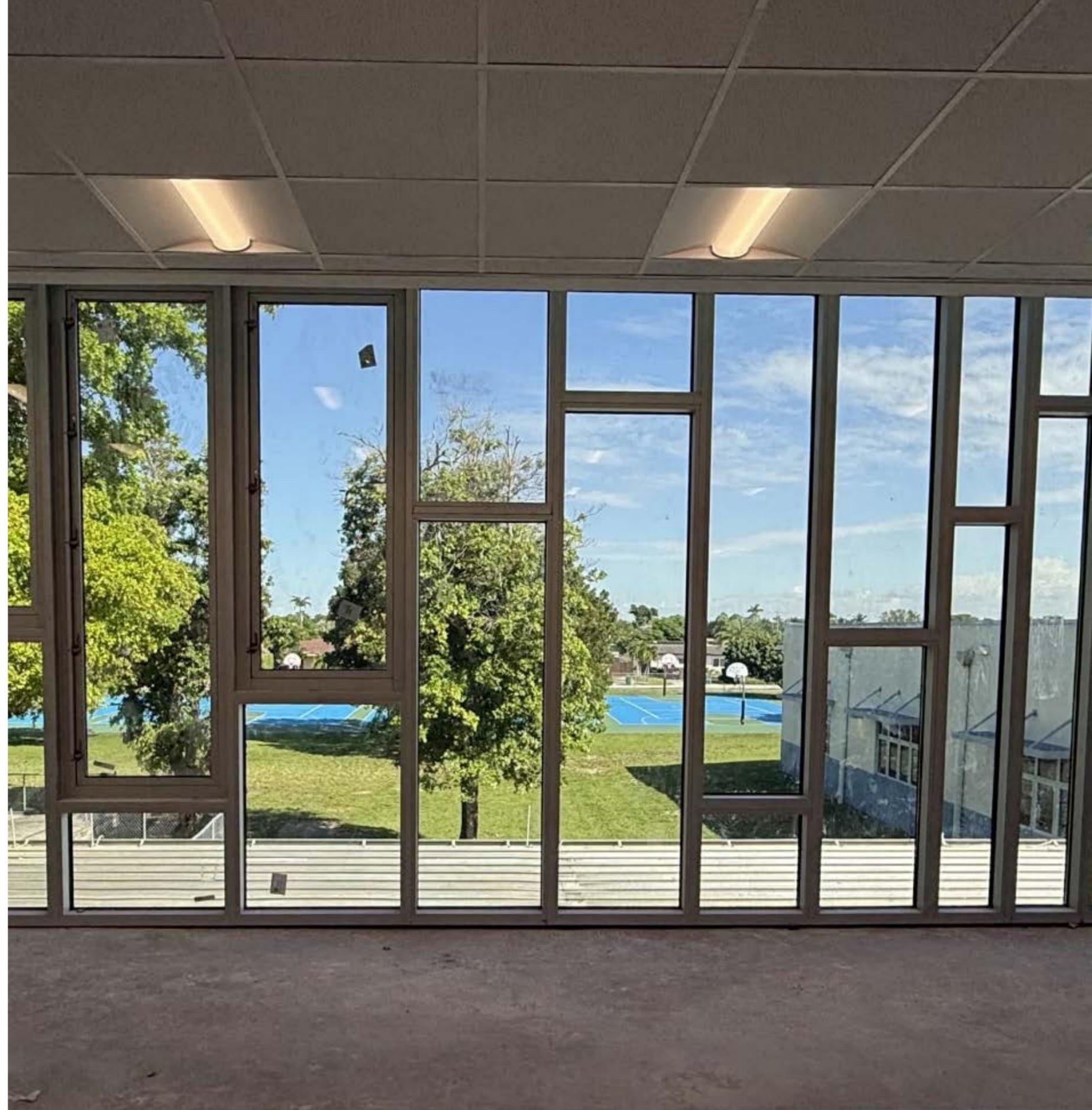
**3rd
The Classroom**

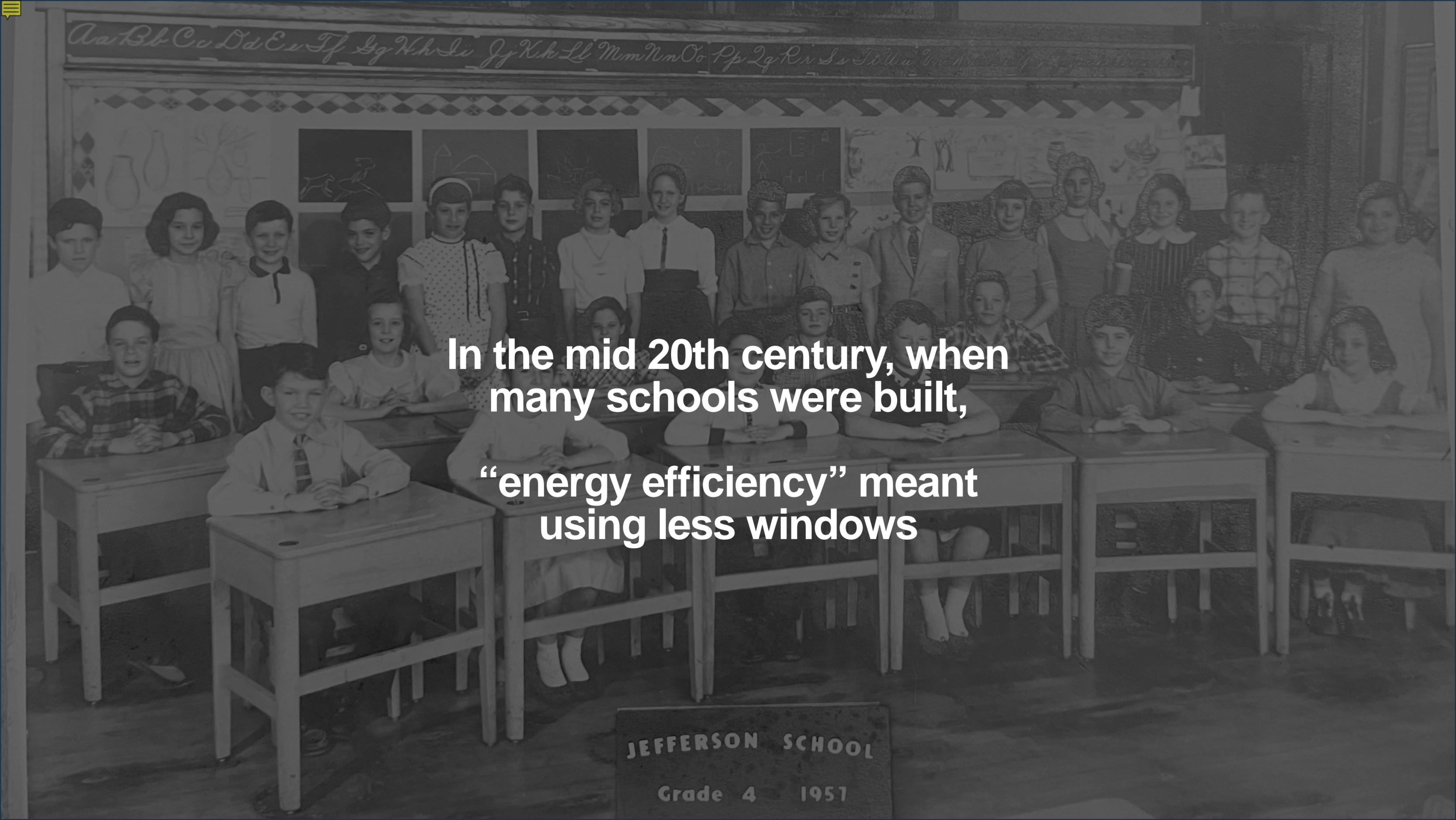


Vision Dominates Perception

2

Natural Lighting

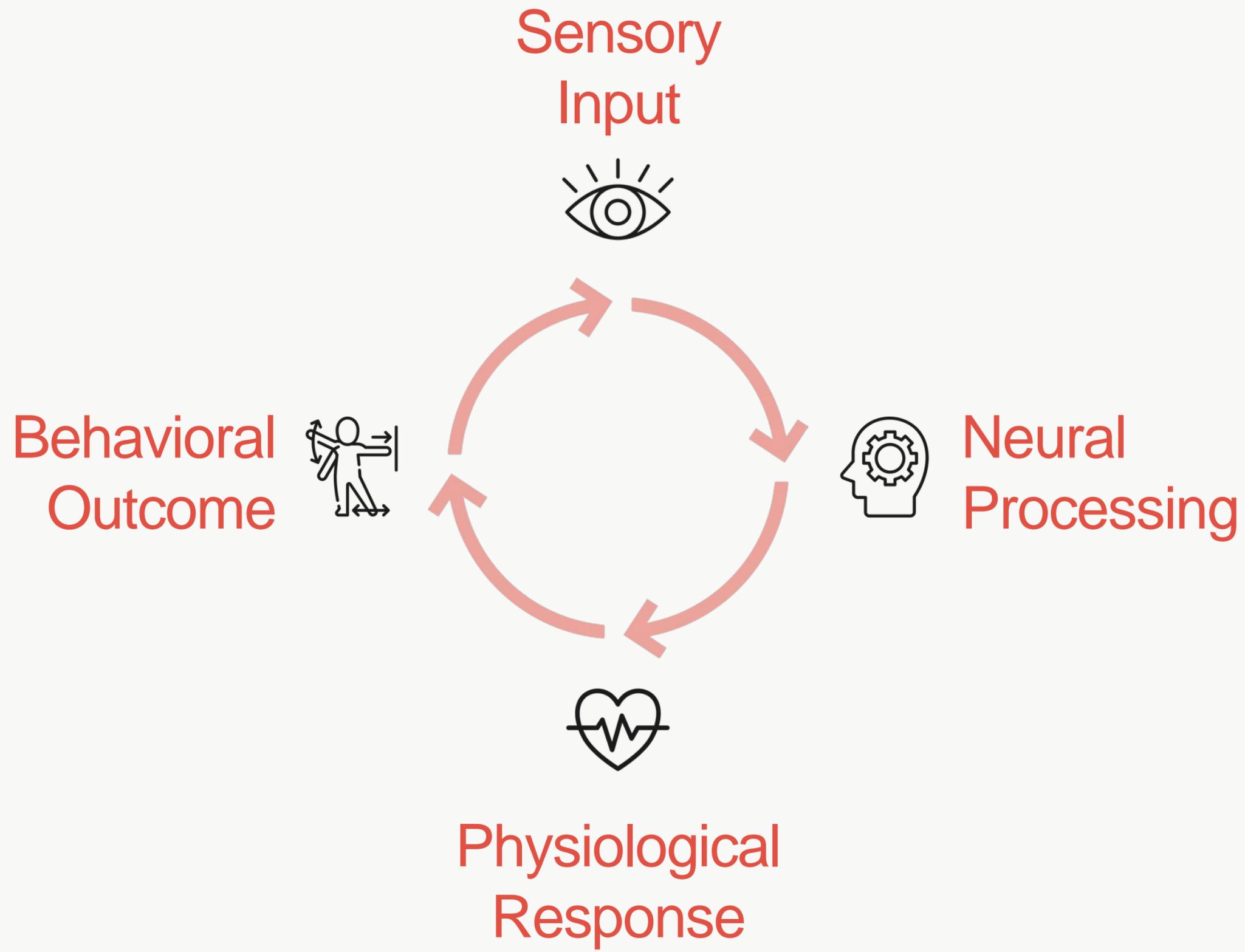




In the mid 20th century, when many schools were built,

“energy efficiency” meant using less windows

JEFFERSON SCHOOL
Grade 4 1951



Light as a design partner

Daylight improves attendance and test scores

The Florida Challenge: managing our natural 10,000 foot-candles

Poorly managed light creates hot spots, leading to visual fatigue, causing teachers to close blinds and lose the daylighting benefits

Students in well-lit classrooms progressed **20%** faster in math and **26%** in reading



Natural Daylighting → **Academic Performance**

Natural Light and the Human Body

*Physiological

Improve	Decrease	Improve	Decrease
Vitamin D	Cancer Possibility	Mood	Depression
Visual System	Abnormal Bone Formation	Mental Performance	Stress
Circadian Rhythms	-	Alertness	Sadness
Sleep Quality	-	Brain Activity	Violent Behavior

Psychological

** Improvements in test scores of students in classrooms with better daylighting

Daylighting conditions in classrooms	Average Improvement*	
	Reading	Math
Classrooms with most overall daylighting (from skylight and windows) relative to classrooms with least overall daylighting	26% (0.1%)	20% (0.1%)
Classrooms with most window area compared to classrooms with least window area	23% (0.1%)	15% (0.1%)
Skylight A (diffused illumination with manual operation for controlling illumination level) relative to no skylight	19% (0.3%)	20% (0.1%)
Skylight B (direct illumination with no controls) relative to no skylight	-21% (5.1%)	-
Operable windows, relative to classrooms without operable windows	8% (0.4%)	7% (0.1%)

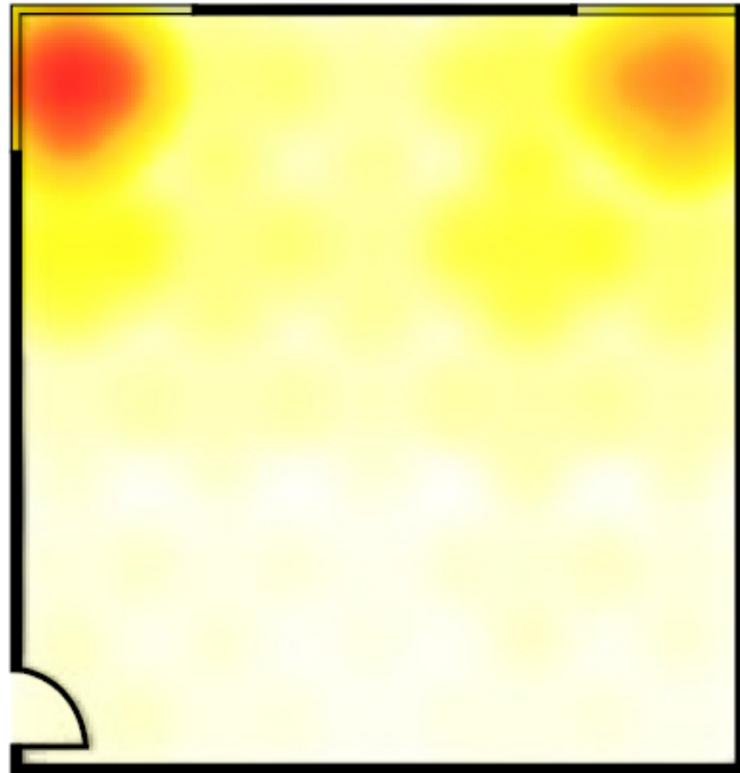
* (Probability that observed association with improved test scores is due to chance)
Conducted fall to spring in Capistrano School District

*research by N. Shishegar and M. Boubekri

** Daylight Study by L. Heschong and the Heschong Mahone Group

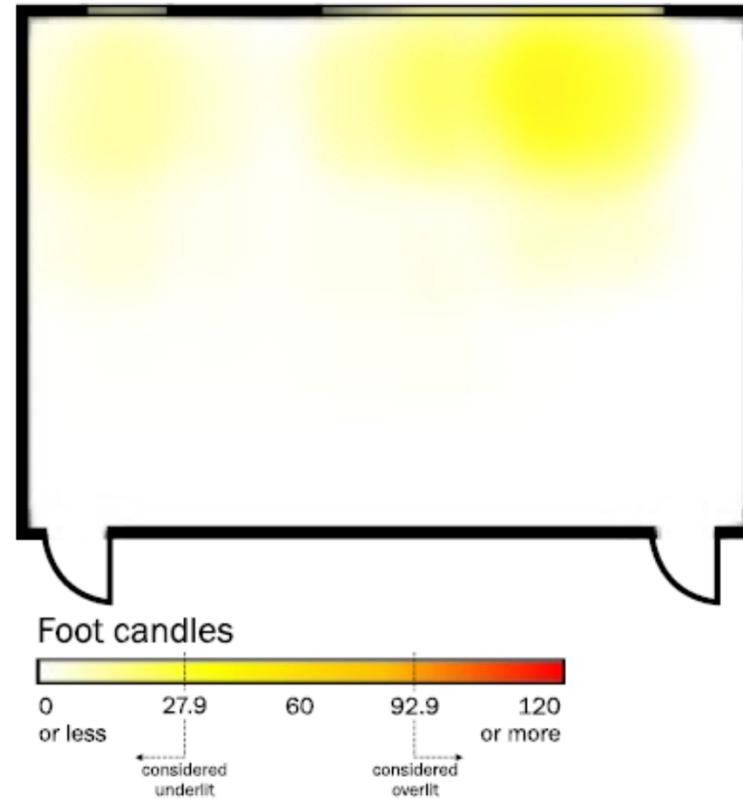
Daylight distribution in classrooms

Modernized



School 4 - Class #3
10:15 AM

Non-modernized



School 8 - Class #2
11:47 AM

Teachers in modernized schools felt their classrooms were **brighter** and were more satisfied

modernized schools are

18%

less underlit
but were slightly more overlit

Modernized schools had, on average, better daylight distribution and were more evenly lit than classrooms in non-modernized schools. Non-modernized schools were found to be more reliant on electricity.

*2023 Latrobe Prize: Multi-Billion Dollar Challenge (by Perkins Eastman)



3

Strategic Use of Color

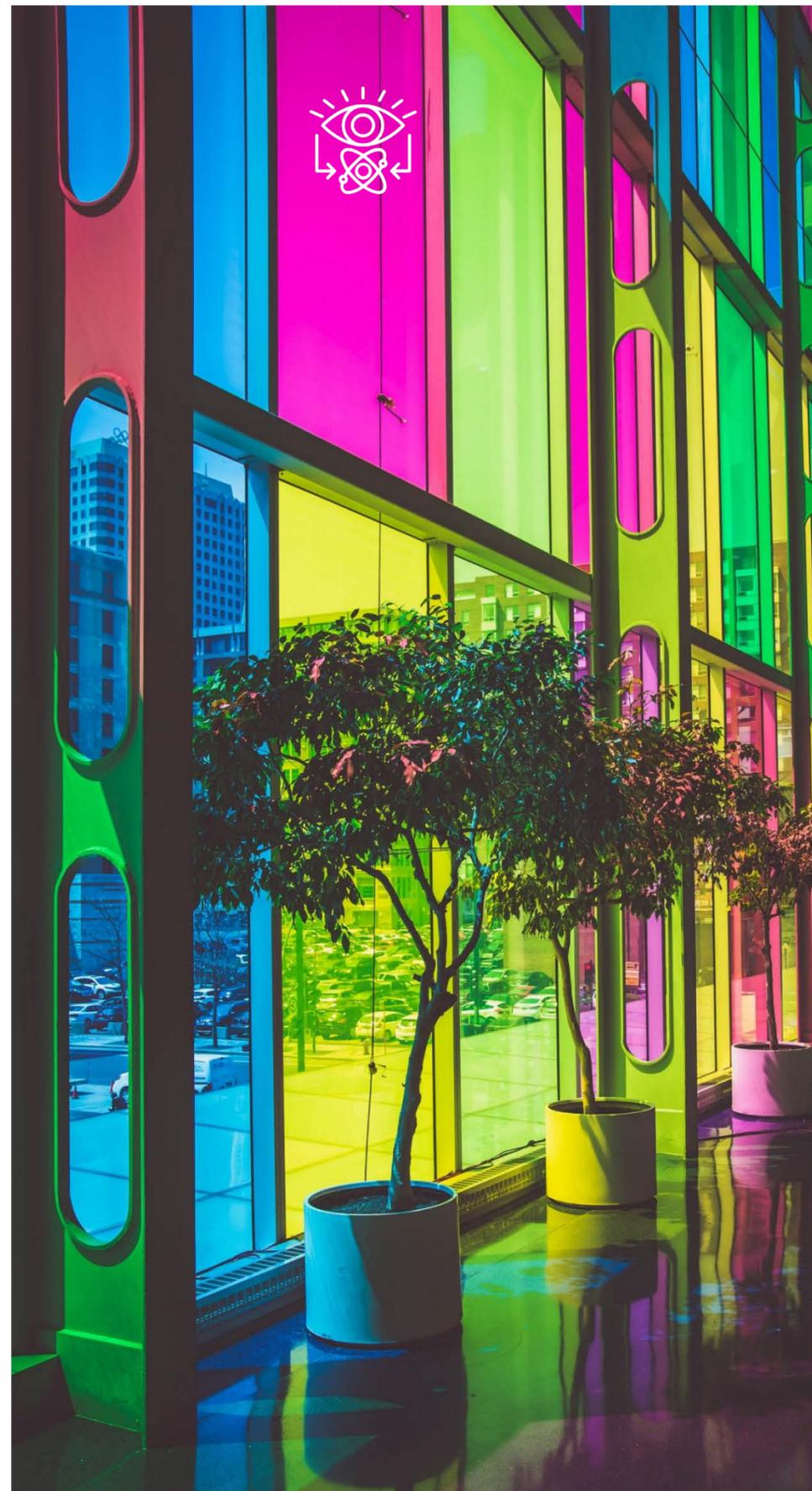
Color

How do we, as designers and planners, want occupants to feel or perform in the spaces we create?



Color

In the same way the lack of color can make one depressed, the addition of color can affect energy, performance, mood – it can even help to promote healing



The human eye can see 7 million colors



Color & Science according to Newton



The first detailed understanding of the science of color began in 1666 when Sir Isaac Newton identified colors as a spectrum produced by a glass prism.

Refracted white light defined seven colors: red, orange, yellow, green, blue, indigo, and violet.

ROYGBIV!



Red
WARM | PASSION | ANGER
ENERGY | DANGER | LIFE
AGGRESSION | BLOOD | JOY

Orange
ENERGY | BALANCE | HUMILITY

White
PURITY | NEUTRALITY | JOY

Brown
RELIABILITY | APPROACHABLE | EARTH

Green
FRESH | CALM | CLEAN
NATURAL | PEACE | LIFE
QUIET | SOOTHING | JOY

Gold
WEALTH | WARREN | MAJESTIC

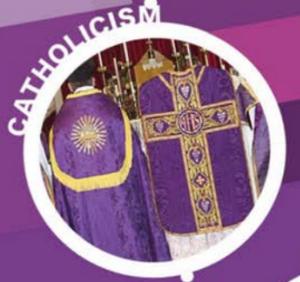
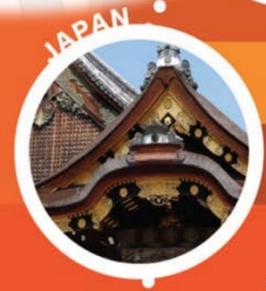
Gray
INTELLECT | NEUTRAL | REFINED

Blue
PURITY | NEUTRALITY | HONOR
SADNESS | PEACE | DIGNITY

Purple
MYSTIC | MAJESTIC | SPIRITUALITY

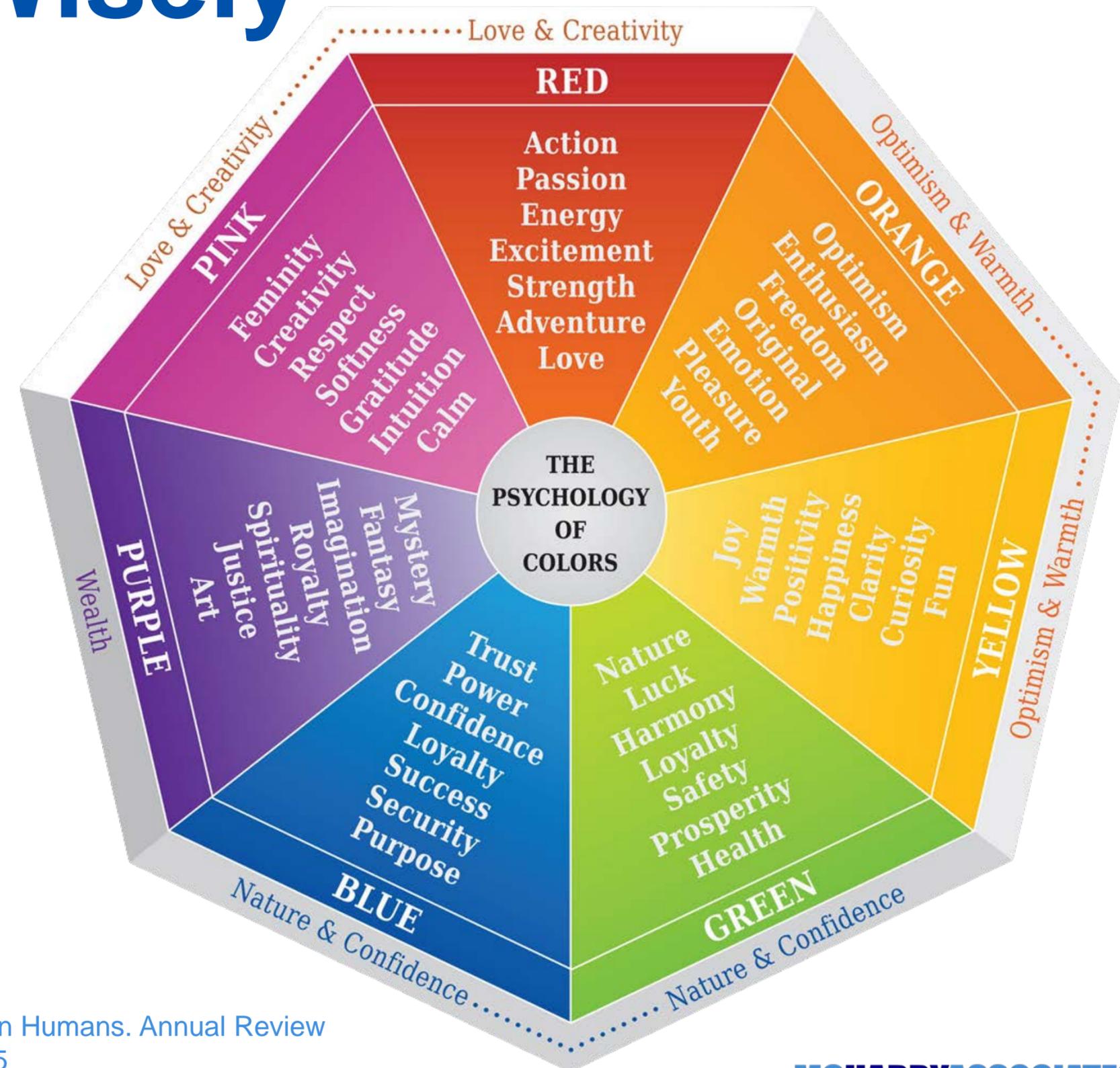
Black
DEPRESSION | EVIL | MYSTERY
SOPHISTICATION

Pink
LOVE | CALM | FEMINE



Color: Choosing Wisely

Common cultural associations of color (popular infographic; associations are context- and culture-dependent). Research supports that color can influence affect/cognition/behavior, but specific meanings are not universal.*



*Color Psychology: Effects of Perceiving Color on Psychological Functioning in Humans. Annual Review Psychology. 65:95-120. <https://doi.org/10.1146/annurev-psych-010213-115035>

Color: Psychological + Physiological Responses

Color is powerful! But too much of it can become **visual noise**.

When it's excessive or inconsistent, it can feel **overstimulating**.

Because color meanings and emotional associations vary across cultures and contexts, selecting a limited, intentional palette is essential, especially in **learning environments** .



Color: Psychological + Physiological Responses

Color can have a positive or negative impact on **mental health** and **well-being**.

It is important to consider the end user of each space when choosing colors.

Psychological + Physiological responses can range, but research gives us positive and negative reactions worth considering.

62-90%

of initial impressions are based on color*.

Color plays a big role in marketing, design, branding, and **therapy**.

*Satyendra Singh's article "Impact of color on marketing" (2006)

Color: Psychological Responses

calmness, tranquility, relaxation OR sadness and melancholy

freshness, growth, harmony OR envy and greed

happiness, cheer, joy OR agitation, anxiety and unease

courage, motivation, stimulation OR anger, aggression and stress

warmth, energy, boldness OR frustration and caution

softness, creativity and calm OR nervousness

creativity, spirituality, luxury OR arrogance, and moodiness

maturity, reliability, intelligence OR sadness and conservatism

mystery, sophistication, security OR death and evil

innocence, simplicity, blankness OR coldness, and sterility



Color: Physiological Responses



Color in Empathetic & Neurodiverse Environments

Empathetic environments are designed through understanding the needs of all people living and working in a space. In educational spaces, a holistic approach to empathy aims to support students and teachers by creating elevated learning environments.

Neurodiversity is one aspect to consider when creating empathetic spaces. We are all neurodiverse to some extent, as we each learn, experience, and interact with our environments in different ways.

*Use muted and pastel colors
a calmer palette is part of reducing overwhelm

Pair color choices with low-reflectivity wall and flooring finishes to reduce glare
color isn't isolated; it is one of several "material decisions" that together reduce triggering inputs

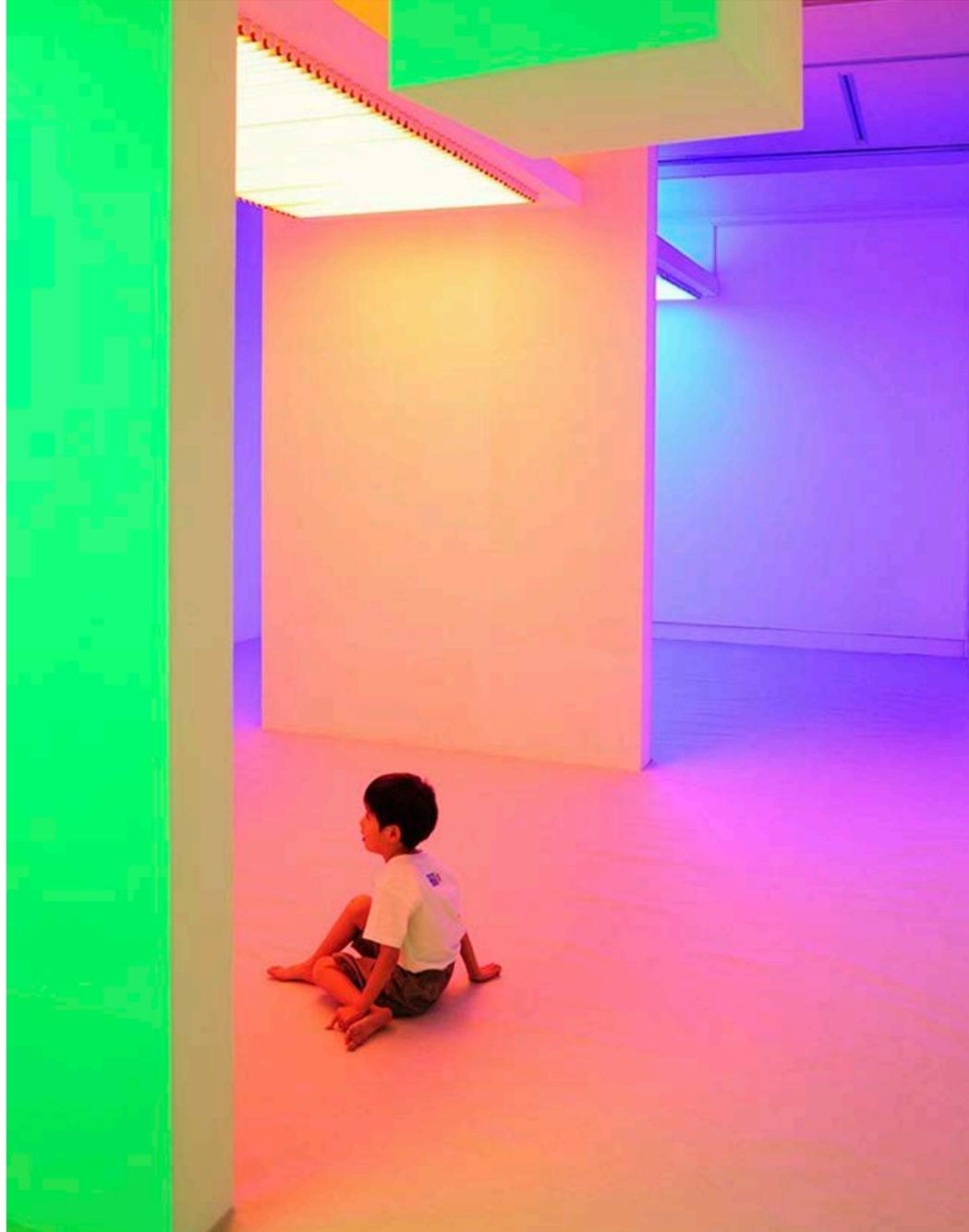
15-20%

of the population is recognized as neurodivergent- some encompassing autism, ADHD, or PTSD**

*Designing better built environments for a neurodiverse world. www.cannondesign.com

**Designing for Neurodiversity: An autistic teenager in school. www.cannondesign.com

Color & Space



*Carlos Cruz-Diez - Chromosaturation

Color Palette - Developmental Strategy

K-2
(5-7)

- High need for simple cues
- Shorter attention spans
- Wayfinding by color/shape works well

GR 3-5
(8-10)

- Can handle more variety
- Benefit from clear zones
- Avoid overly “busy” walls near instruction

GR 6-8
(11-13)

- Identity + belonging become central
- Color can mark “team houses” / pods
- Add warmth in social areas

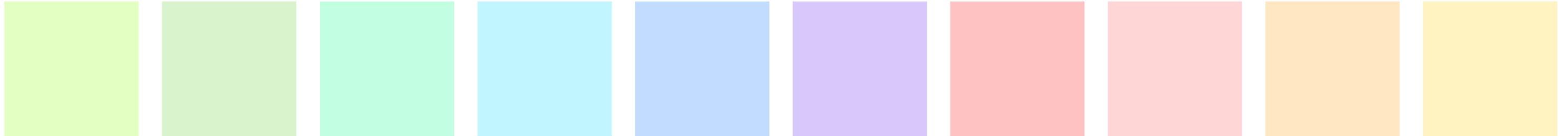
GR 9-12
(14-18)

- More adult palettes support autonomy
- Use color for program identity (STEM/arts)
- Prioritize durability + acoustics in commons

younger = simpler and more legible cues;

older = calmer palettes + targeted identity moments

Color Palette - Pastel



- Pastel colors can reduce stress and promote emotional wellbeing, especially when compared to more saturated or intense hues.
- Soft pastel shades like sage green and powder blue are increasingly used in environments to foster clarity, creativity and emotional balance.

Color + Light

Glazing is no longer just about looking out. By using colored interlayers, light becomes an **active interior element.**



When Light becomes an Experience

Colored Glazing **reduces glare** while maintaining daylight

Filters daylight without darkening spaces

Can act as wayfinding and identity

Can set an **emotional tone**

a tinted environment can feel calmer, warmer, cooler, more playful, more sacred

Can change **comfort** through glare perception

people report glare differently depending on the tint

Can affect **alertness** and cognitive readiness

heavy blue/green may feel “crisp/awake,” while amber/bronze may feel “cozier/softer.”

*Influence of color on glare perception revealed when seeing the sun through colored glazing.

<https://pubmed.ncbi.nlm.nih.gov/41087461/>



4

Murals & Storytelling

Believing in the ability of art to create a positive environment for learning, [aWall Mural Projects](#) has produced over 150 murals at schools across Miami-Dade County since 2018. Founded and directed by artist Sergio Arce, who paints under the name [Registered Artist](#), this year's round of murals reached a peak during Miami Art Week. During that time, about 30 international artists descended on Miami to transform bleak school walls into something special.

aWall Mural Projects (@awallmuralprojects)
Artist: Nina Valkhoff



aWall Mural Projects



aWall Mural Projects (@awallmuralprojects)
Artist: Registered Artist

aWall Mural Projects

Dunbar Elementary School

Wynwood, Miami



www.brooklynstreetart.com
Artist: Zach Curtis. Photographer © Jaime Rojo

aWall Mural Projects

Dunbar Elementary School

Wynwood, Miami



www.brooklynstreetart.com

Artist: w3r3on3. Photographer © Jaime Rojo

aWall Mural Projects
Dunbar Elementary School
Wynwood, Miami



www.brooklynstreetart.com
Artist: Sophy Tuttle. Photographer ©
Jaime Rojo

The Raw Project in Wynwood

The initiative of Robert de los Rios, who partnered with private contributors, did fundraising, and asked a coalition of artists to paint the walls of the schools for the kids.

Eneida M. Hartner
Elementary School
Wynwood, Miami

Two Miami Schools Enveloped in Murals : The RAW Project in Wynwood | Brooklyn Street Art
Artist: ZED1. Photographer © Jaime Rojo



**The Raw Project in
Wynwood**

Eneida M. Hartner
Elementary School
Wynwood, Miami



Two Miami Schools Enveloped in Murals : The RAW Project in Wynwood | Brooklyn Street Art
Artist: Mr. June. Photographer © Jaime Rojo

The Raw Project in Wynwood

Eneida M. Hartner Elementary School

Wynwood, Miami



Two Miami Schools Enveloped in Murals : The RAW
Project in Wynwood | Brooklyn Street Art
Artist: 2501. Photographer © Jaime Rojo

**The Raw Project in
Wynwood**

Jose De Diego Middle School
Wynwood, Miami



Two Miami Schools Enveloped in Murals : The RAW Project in Wynwood | Brooklyn Street Art
Artist: Axel Rod. Photographer © Jaime Rojo

The Raw Project in Wynwood

Jose De Diego Middle School
Wynwood, Miami



Two Miami Schools Enveloped in Murals : The RAW
Project in Wynwood | Brooklyn Street Art
Artist: Bik Izmo. Photographer © Jaime Rojo

The Raw Project in Wynwood

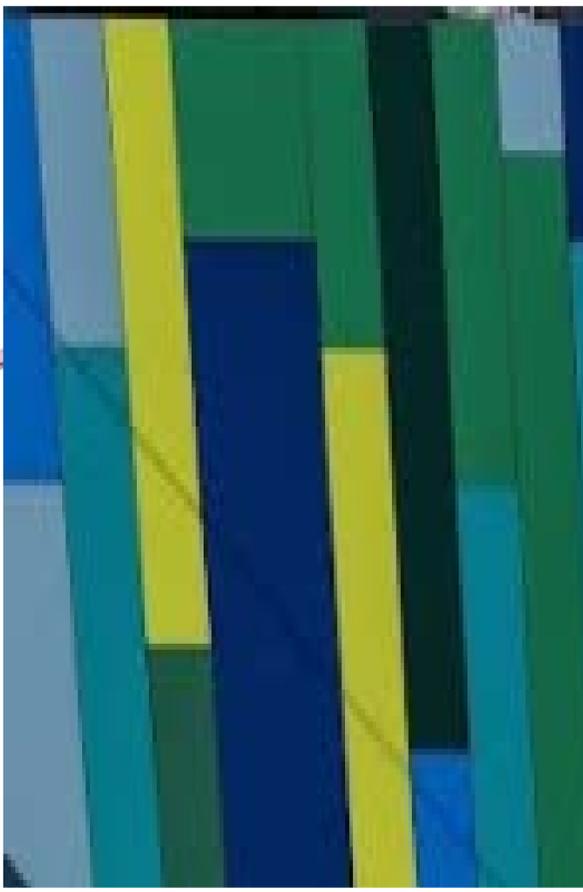
Jose De Diego Middle School
Wynwood, Miami



Two Miami Schools Enveloped in Murals : The RAW
Project in Wynwood | Brooklyn Street Art
Artist: Pip Squeak. Photographer © Jaime Rojo

5

Case Studies





CASE STUDY 1:
**FLAMINGO
ELEMENTARY
SCHOOL**

Owner: MDCPS
Architect: MCHarry Associates
Contractor: MCM
Location: Hialeah

\$12M



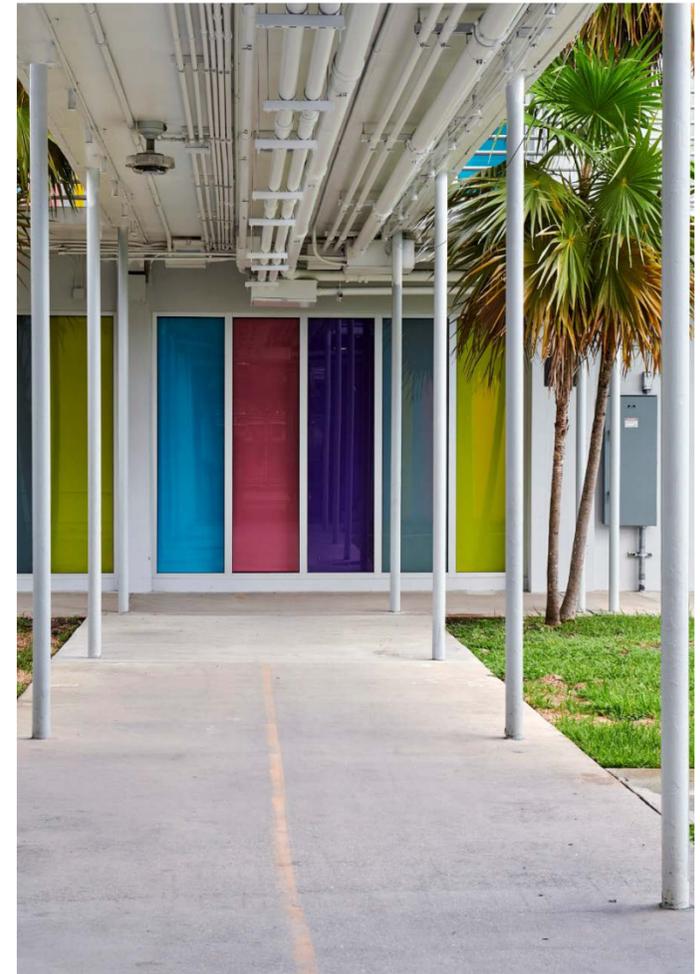
WELCOME































“Hominess, however, is the grounding element: the feeling of **ease** and **safety** that allows us to remain in a space without tension or the need to stay on guard.

Hominess occurs when these cues align - when the environment feels familiar enough to **soothe** us, yet engaging enough to **hold our attention**”



CASE STUDY 2:
**GLADES MIDDLE
SCHOOL**

Owner: MDCPS
Architect: MCHarry Associates
Contractor: LEGO
Location: Miami

\$16M





GLADYS MIDDLE SCHOOL





GLADES
MIDDLE SCHOOL
272/2819

GLADES MIDDLE



GLADES
MIDDLE SCHOOL



GLADES MIDDLE



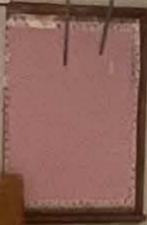


BE KIND
BE BRAVE
BE HONEST
BE HAPPY
BE CREATIVE
BE HUMBLE
BE THANKFUL
BE YOU

united we stand



Dare
To
Believe



date:

week	daily
mon.	
tue.	
wed.	
thur.	
fri.	





6 INT

CertainTeed

CertainTeed

CertainTeed









CASE STUDY 3:
**SOUTHWEST
MIAMI SENIOR
HIGH SCHOOL**

Owner: MDCPS
Architect: MCHarry Associates
Contractor: OHL
Location: Miami

\$16M















main idea the central idea of a piece of writing	support the details that support the main idea	topic the subject of the writing
summary a brief statement of the main idea and supporting details	main purpose the reason for writing the piece	audience the people who are reading the writing
paragraphs a group of sentences that deal with one main idea	topic sentence the sentence that tells the main idea of the paragraph	point of view the way the writer looks at the subject
proposition the main idea of the writing	reasoning the facts and details that support the main idea	tone the writer's attitude toward the subject
conclusion the final part of the writing that sums up the main idea	transition words and phrases that connect the sentences and paragraphs	style the way the writer uses words and sentences

STORY LINE	THEME
exposition the beginning of the story	LOVE CONQUERS ALL
rising action the events that lead to the climax	CONFLICT the struggle between opposing forces
climax the turning point of the story	resolution the end of the story
falling action the events that lead to the end	denouement the final part of the story

SETTING	CHARACTERIZATION
TIME	THOUGHTS
FLAT	ROUND
PROTAGONIST	ANTAGONIST



CONFLICT	MOOD
PERSON vs. PERSON	READER'S EMOTION
PERSON vs. SELF	EMOTIONS
PERSON vs. SOCIETY	PLOT
PERSON vs. NATURE	CHOICE
PROBLEM	World
TECHNOLOGY	Imagery

Figurative Language
Metaphor
Simile
Personification
Hyperbole
Oxymoron
Irony
Symbolism
Allegory
Onomatopoeia
Alliteration
Assonance
Consonance
Repetition

TONE	POINT OF VIEW
Word Choice	Third Person
Imagery	First Person
Figurative Language	Second Person
Repetition	Objective
Consonance	Subjective
Assonance	Point of View
Alliteration	Characterization
Hyperbole	Plot
Oxymoron	Theme
Irony	Setting
Symbolism	Conflict
Allegory	Resolution
Onomatopoeia	Denouement

Computer workstations along the window wall, each with a monitor, keyboard, and mouse.

Computer workstations in the foreground on the left side of the room.

Classroom desks and chairs arranged in rows, with yellow and blue chairs.

Storage shelves with various supplies, including folders, papers, and containers.









Gold –
Warmth,
Illumination,
Success

Gray –
Foundational,
Growth, Maturity

Purple –
Creativity,
Imagination,
Innovation

Royal Blue –
Responsibility,
Trust, Calm











**SOUTHWEST MIAMI
SENIOR HIGH SCHOOL**

8855 SW 50TH TERRACE MIAMI, FL 33165



WELCOME TO
SOUTHWEST
MIAMI
SENIOR
HIGH
SCHOOL

Use light and color as design partners

Intentionality: use color for purpose, not just for decoration

Balance: solve for Florida glare before celebrating Florida daylight

Lifecycle: select finishes, including coatings, for their life cycle not just the day-one ribbon cutting or the initial professional photographs

Identity: reflect the community story to reduce maintenance costs and promote school pride



**SHERWIN
WILLIAMS®**

MCHARRYASSOCIATES

Use light and color as design partners

Murals and environmental graphics improve sense of belonging, reduce vandalism, and support cultural identity.

Design with neurodiversity in mind: overstimulation is a real risk without balance.

Use color to support attention (calm backgrounds) and targeted stimulation (intentional accents).

Different ages need different “visual load” and cueing—from simple to sophisticated.

Make navigation intuitive with color-coded zones, but prioritize contrast + non-glare for accessibility.



MCHARRYASSOCIATES

Choices must survive real schools

MARIEL

Cleanability

Scrub/scuff resistance; consider higher-sheen in corridors, matte at teaching walls.

Stain removal Washability ratings matter where markers, food, or hands contact walls.

Fade resistance Sunlit areas + intense pigments need better fade performance.

IAQ / VOC Use low-emitting paints/coatings suitable for sensitive populations.

Repairability Standardize colors + batch control; keep touch-up kits and documented finish schedules.



**SHERWIN
WILLIAMS®**

MCHARRYASSOCIATES



Human Impact: Identify the psychological and physiological impacts of color and daylight

Visual Comfort: Evaluate how glazing strategies and daylighting design contribute to visual comfort and attention

Identity & Equity: Analyze case studies where colorful paint, murals, and finishes promote student engagement and school identity.

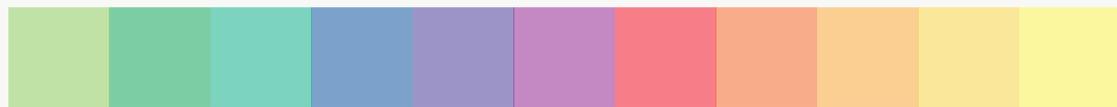
MCHARRYASSOCIATES



**SHERWIN
WILLIAMS®**

Thank you!

Naomi Harrison // Mariel Basurco // Tristan Sykes





True or False

Brighter spaces always improve student focus.



True or False?

Brighter spaces always improve student focus.

FALSE — Overly bright or glary environments cause eye strain, fatigue and distraction, especially on glossy surfaces or screens.



Which space do you think has the greatest impact on student behavior?

Classroom

Corridor

Cafeteria

Media Center

Outdoor Learning Space

Resources

<https://www.apa.org/pubs/reports/stress-in-america/2025>

<https://mind.help/topic/color-psychology/>



Which space benefits MOST from calm,
low-saturation colors?

A. Cafeteria

B. Testing rooms

C. Gymnasium

D. Main entry