2021

Beyond the Now

The Future of Successful Facilities is in the 3 W's

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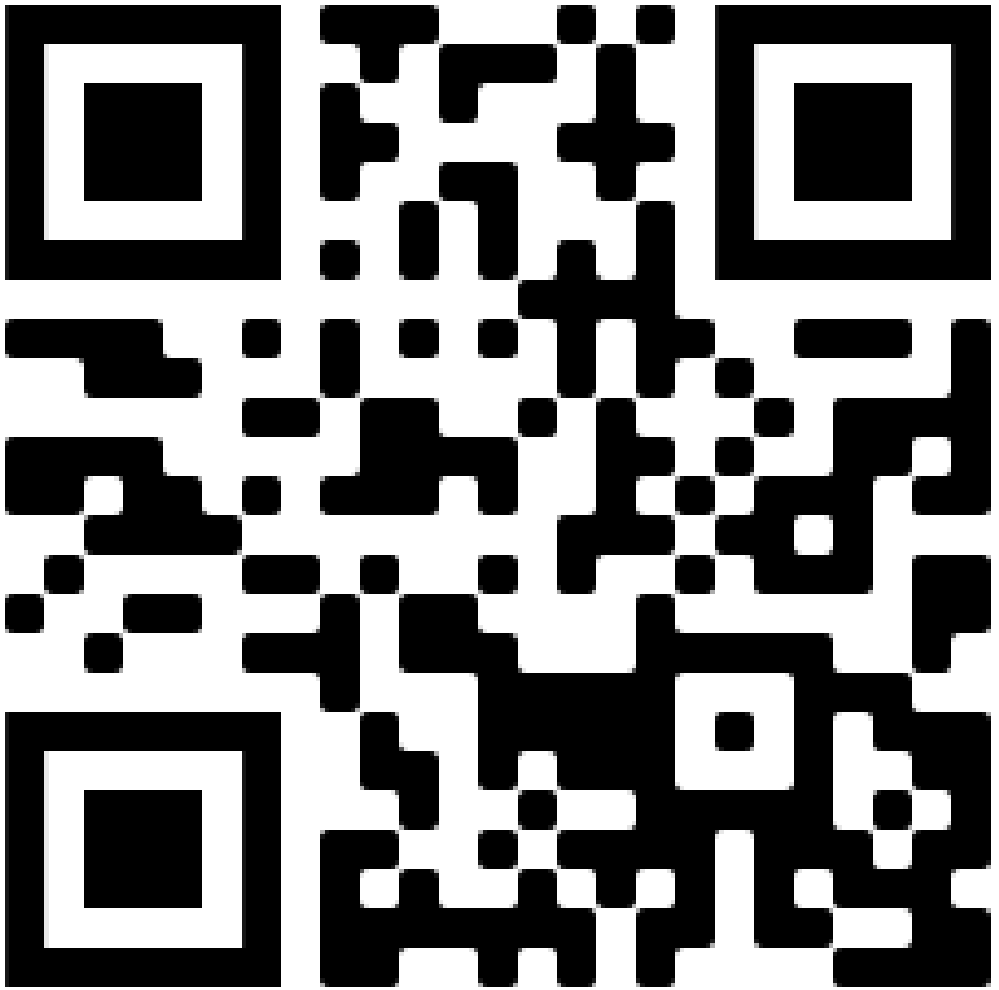
PRINCIPAL
Little Diversified Architectural Consulting

WHO ARE YOU?



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FEFPA Winter 2021 Presentation

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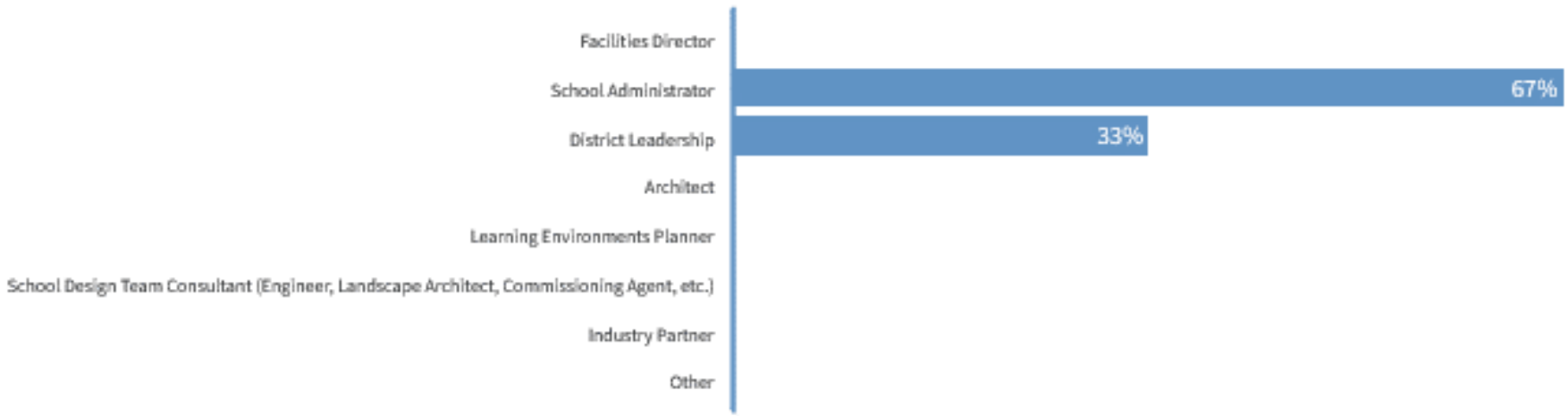
Are you



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Beyond the Now – The Future of Successful Facilities is in the 3 Ws

HP-106

Tomas Eliaeson, Sean Tracy, Tracy Steward

March 3, 2021

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Course Description

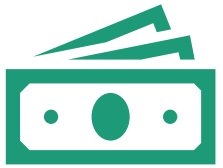
Over the past several months The CDC's 3 Ws have been at the center of our health and wellness – Wear a Mask, Wait 6-feet apart and Wash your hands. As we think about educational facilities now and beyond COVID-19, we look toward an additional set of 3 Ws – Win, Win, Win. This presentation will focus on how facilities achieve the three "Wins" of High Performance (both in buildings and in students), Sustainability and Financial Investment while maintaining a sharp focus on learning environments that promote occupant health and wellness. We'll dive into energy auditing, revamping HVAC systems, combating sick building syndrome and creating resiliency while weaving the financial thread that impacts your school system now and in the future.

Learning Objectives

At the end of this course, participants will be able to:

1.Explain how Wellness can elevate student outcomes by increasing comfort to those returning to the classroom and interpreting research on IAQ, lighting and acoustics.

2. Demonstrate how to successfully implement high performance to resiliency by evaluating the prescriptive measures that are recognized by ASHRAE, LEED and WELL.



3. Identify Life Cycle Cost and ROI by distinguishing cost-effective wellness and sustainability features in buildings and identify options for funding under the CARES Act.

4. Analyze the synergy in wellness and sustainability through a case study at NeoCity Academy in Osceola County Schools.

AGENDA

1st WIN - Explain how Wellness can elevate student outcomes

- Understanding the connection between neuroscience, wellness and learning
- Increasing comfort to those returning to the classroom
- Interpreting research on IAQ, lighting and acoustics

2nd WIN - Demonstrate how to successfully implement high performance to resiliency

- Internalizing “The Why” of sustainability, resiliency and regeneration
- Learning the ABC’s of a high performance project
- Evaluating the prescriptive measures (recognized by ASHRAE, LEED and WELL)

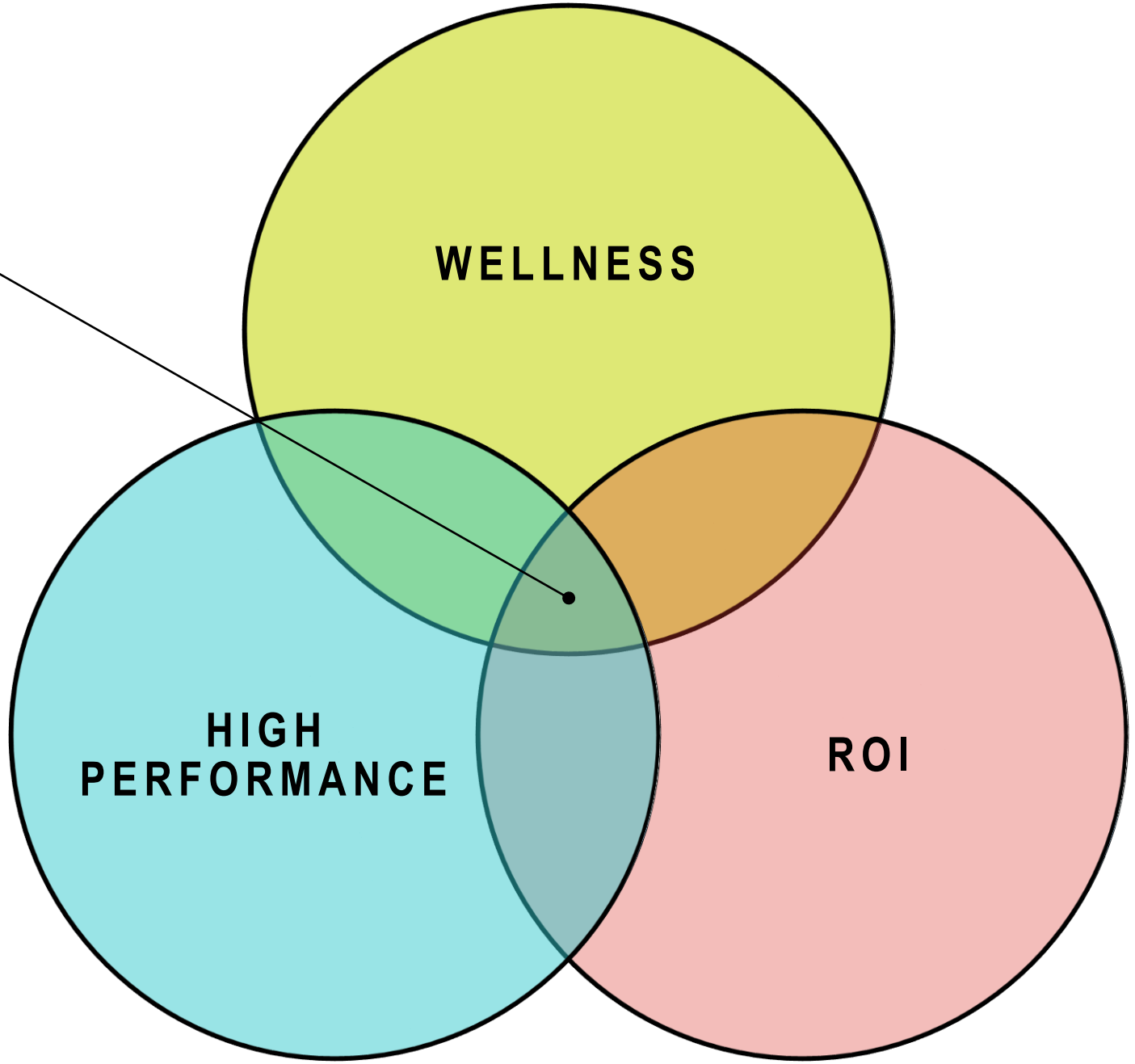
3rd WIN - Identify Life Cycle Cost and ROI

- Distinguishing cost-effective wellness and sustainability features
- Identifying options for funding under the CARES Act

MASTERMOVE - Analyze synergies in wellness, sustainability and cost

- Case study at NeoCity Academy in Osceola County Schools

‘MASTERMOVE’



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WELLNESS

When poll is active, respond at **PollEv.com/heatherm550**

Text **HEATHERM550** to **22333** once to join

Do you believe that Wellness should be prioritized in the design of future schools and renovations of existing schools?

Yes

No

When poll is active, respond at **PollEv.com/heatherm550**

Text **HEATHERM550** to **22333** once to join

How will COVID-19 change the way you approach the design of Learning Environments?

No change

Small modifications (systems - HVAC, Plumbing, Lighting, Interior Materials)

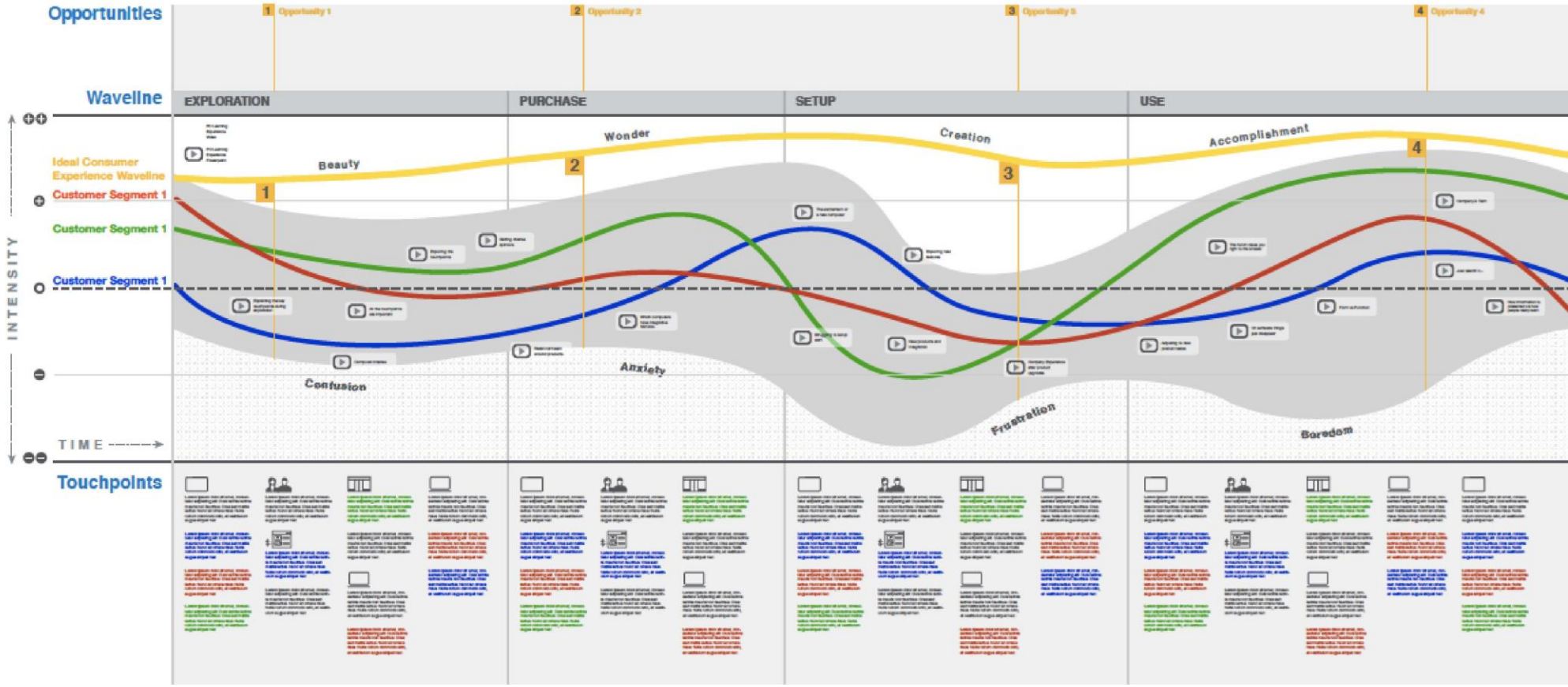
Considerable Modifications (Systems – HVAC, Plumbing, Lighting, Interior Materials)

Large Scale Modifications (Systems - HVAC, Plumbing, Lighting, Interior Materials)

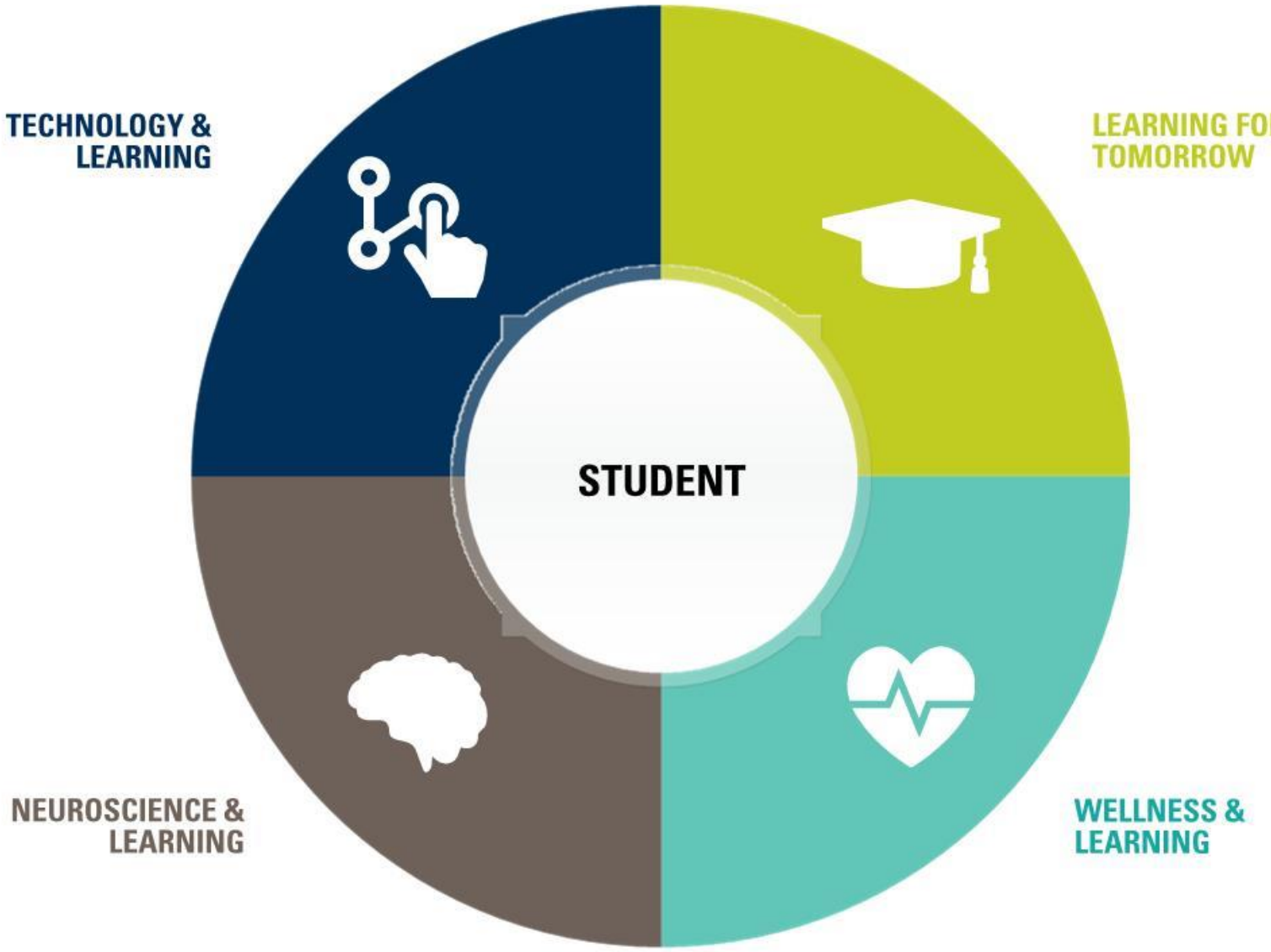
WELLNESS

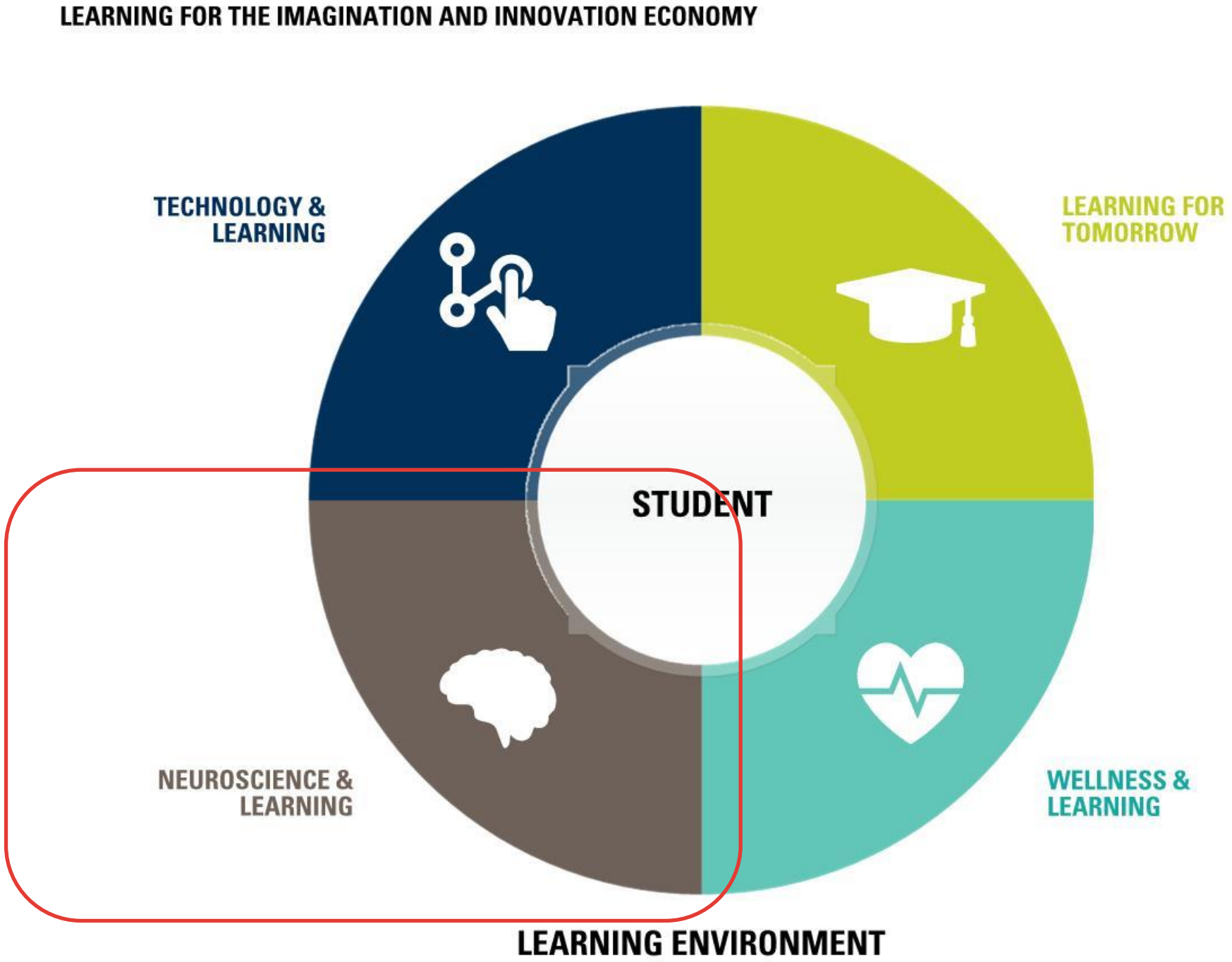
AUGMENTATION

...OF YOUR STUDENT'S EXPERIENCE

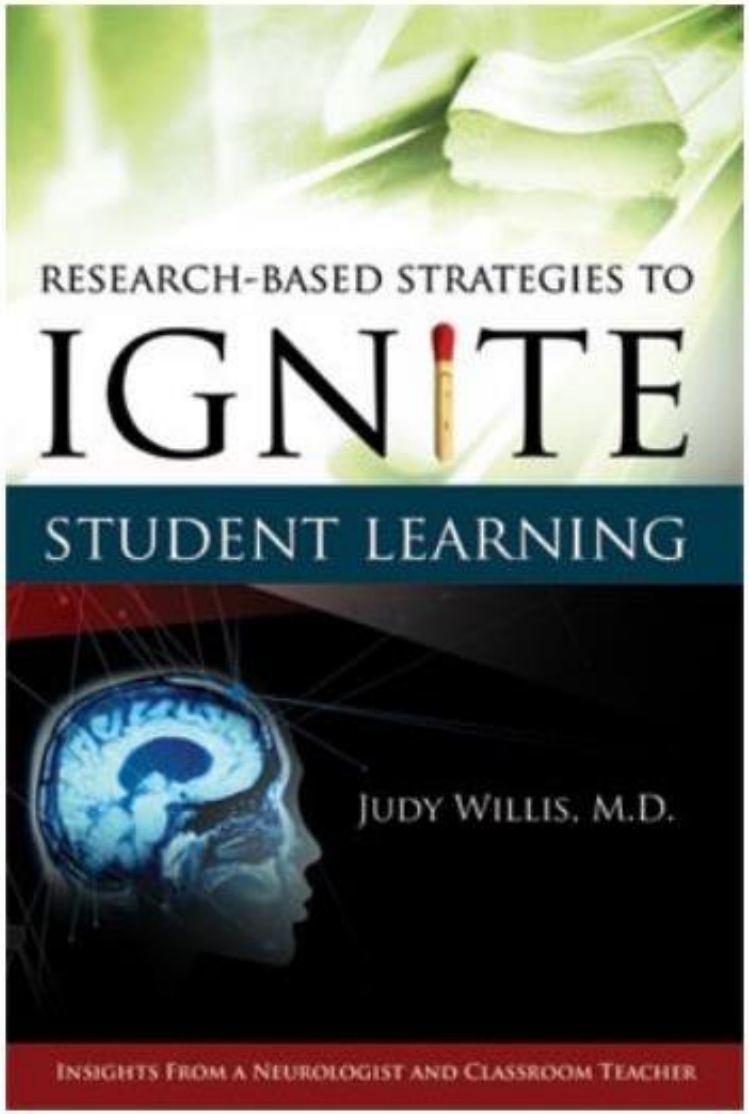


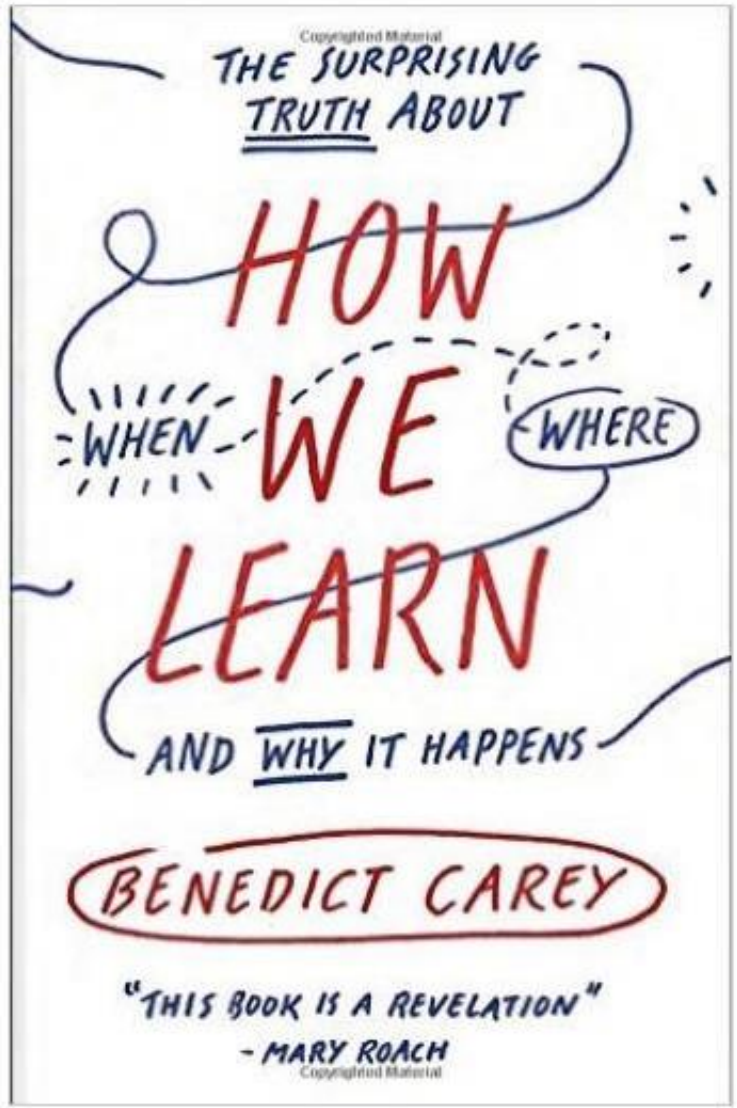
LEARNING FOR THE IMAGINATION AND INNOVATION ECONOMY




LEARNING FOR THE IMAGINATION AND INNOVATION ECONOMY
TECHNOLOGY & LEARNING
LEARNING FOR TOMORROW
STUDENT
NEUROSCIENCE & LEARNING
WELLNESS & LEARNING
LEARNING ENVIRONMENT

THE LEARNING BRAIN


RESEARCH-BASED STRATEGIES TO
IGNITE
STUDENT LEARNING
JUDY WILLIS, M.D.
INSIGHTS FROM A NEUROLOGIST AND CLASSROOM TEACHER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AND WHY IT HAPPENS
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"THIS BOOK IS A REVELATION"
- MARY ROACH
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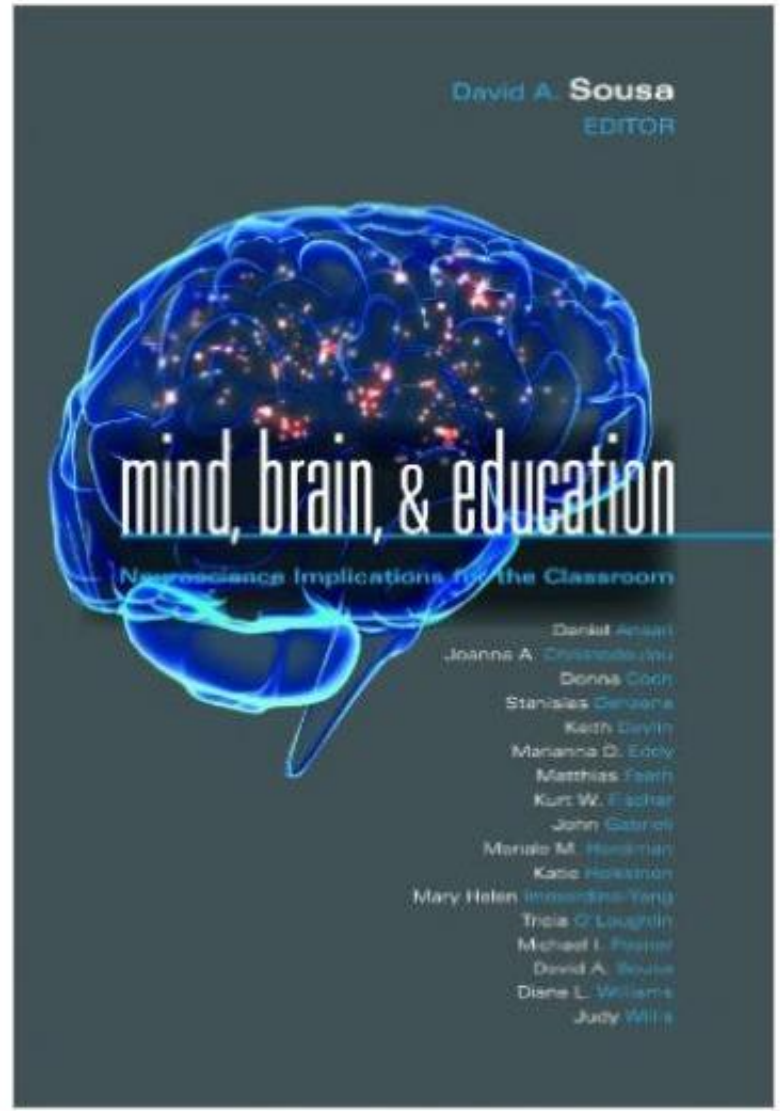
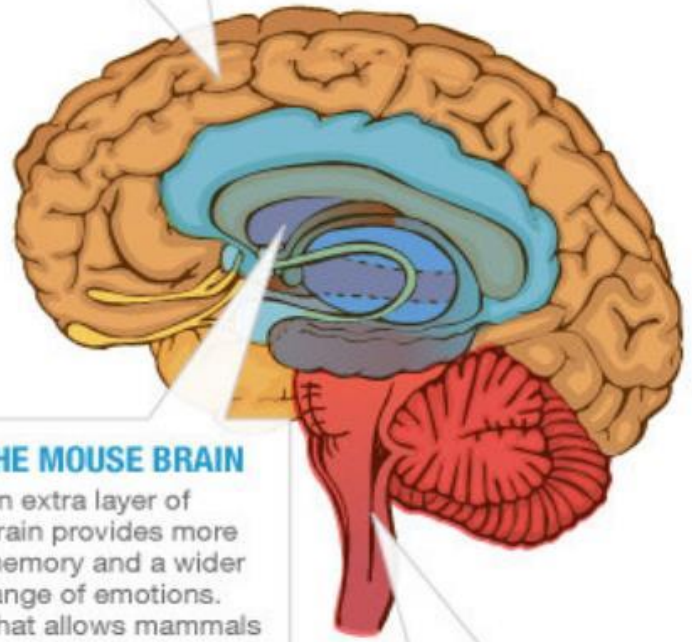

David A. Sousa
EDITOR
mind, brain, & education
Neuroscience Implications for the Classroom

THE HUMAN BRAIN

With 100 billion cells and 500 trillion connections, this part of the brain allows us to solve difficult problems and navigate a very complex social world. It's also responsible for imagination, culture and the ability to figure out what other people are thinking based on social cues.

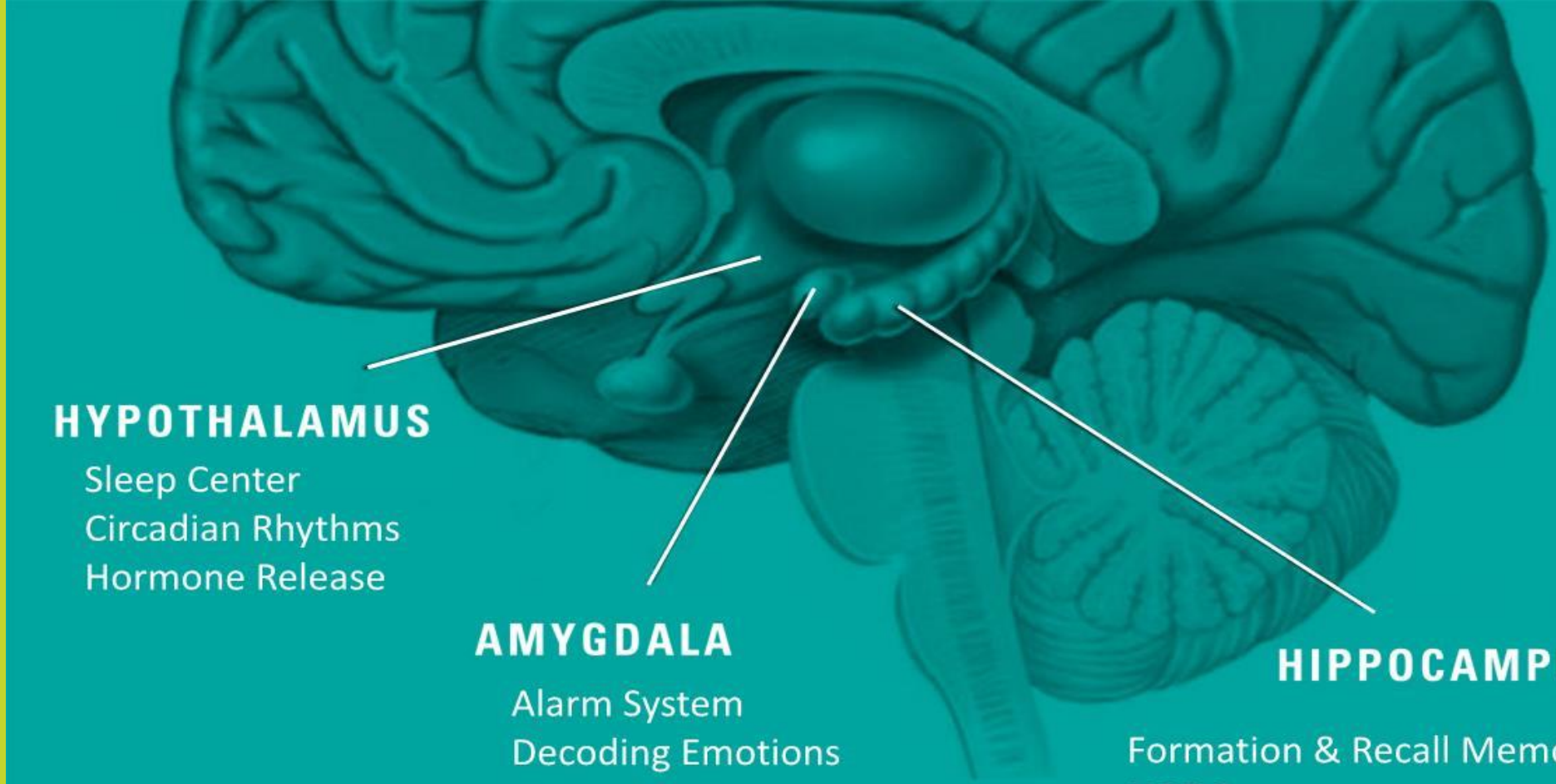


THE MOUSE BRAIN

An extra layer of brain provides more memory and a wider range of emotions. That allows mammals to do things like learn from their experiences and anticipate danger, rather than merely reacting to it.

THE LIZARD BRAIN

This ancient brain is all about survival. When danger appears, it decides whether to fight or flee.



HYPOTHALAMUS

Sleep Center
Circadian Rhythms
Hormone Release

AMYGDALA

Alarm System
Decoding Emotions
Processing Memories

HIPPOCAMPUS

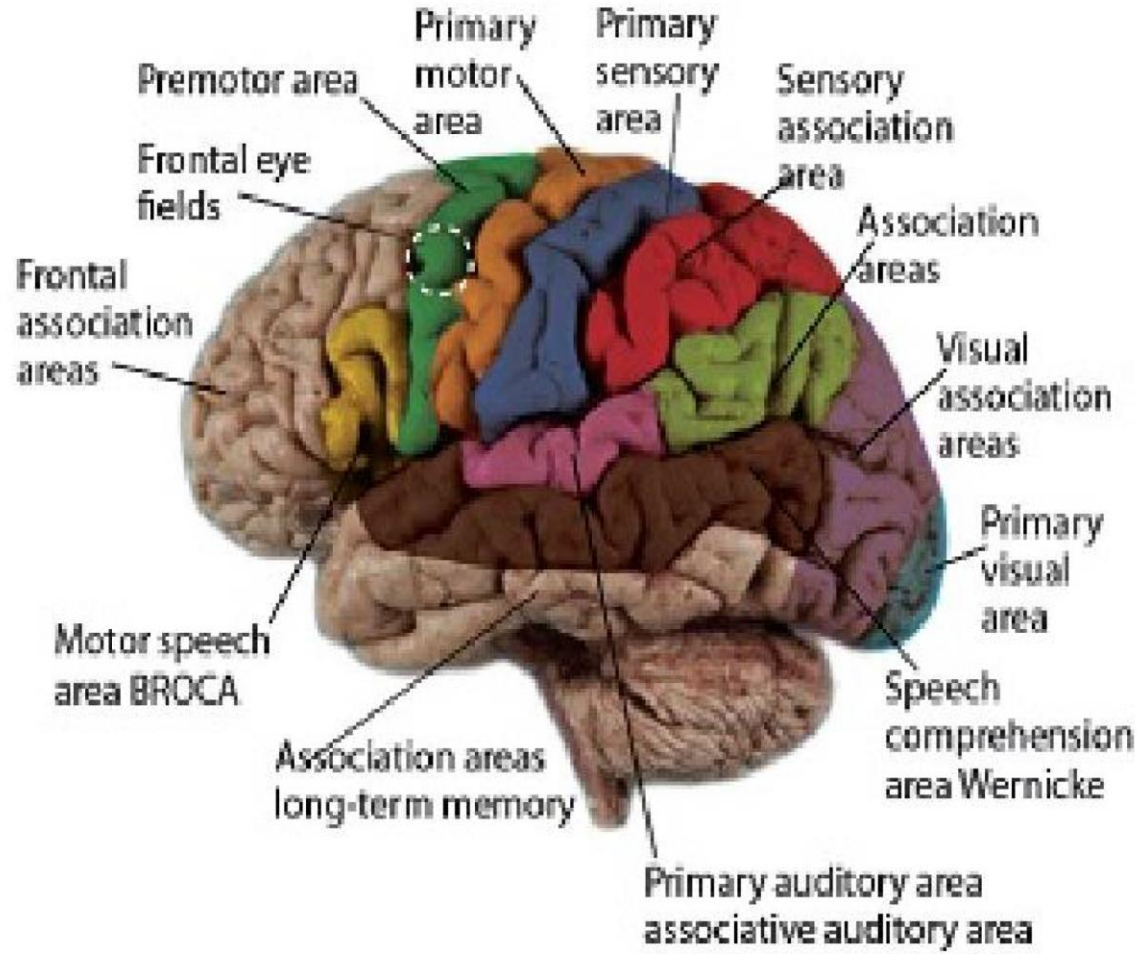
Formation & Recall Memories
NOT Storage
Orientation / Environment

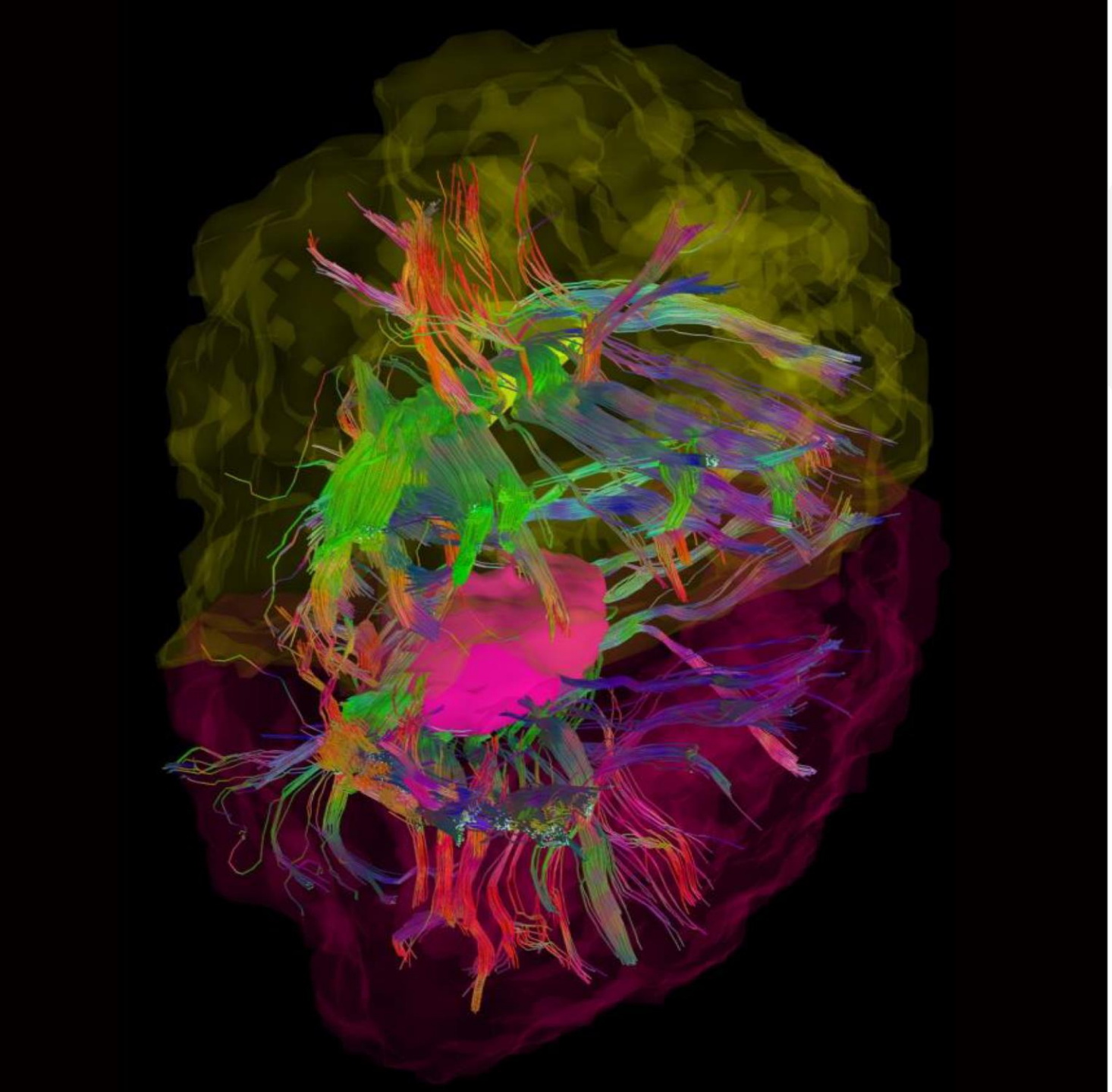
THE STRUCTURES IN THE BRAIN

S. Wirth et al, 2003

THE PROCESS OF MEMORIZATION

THE SOMATOSENSORY CORTEX AREAS - EACH INDIVIDUAL SENSE (HEARING, SMELLING, TACTILE, VISUAL, MOVEMENT) RECIEVES INPUT WHICH IS THEN CLASSIFIED OR IDENTIFIED BY COMPARING IT TO PREVIOUSLY STORED DATA.

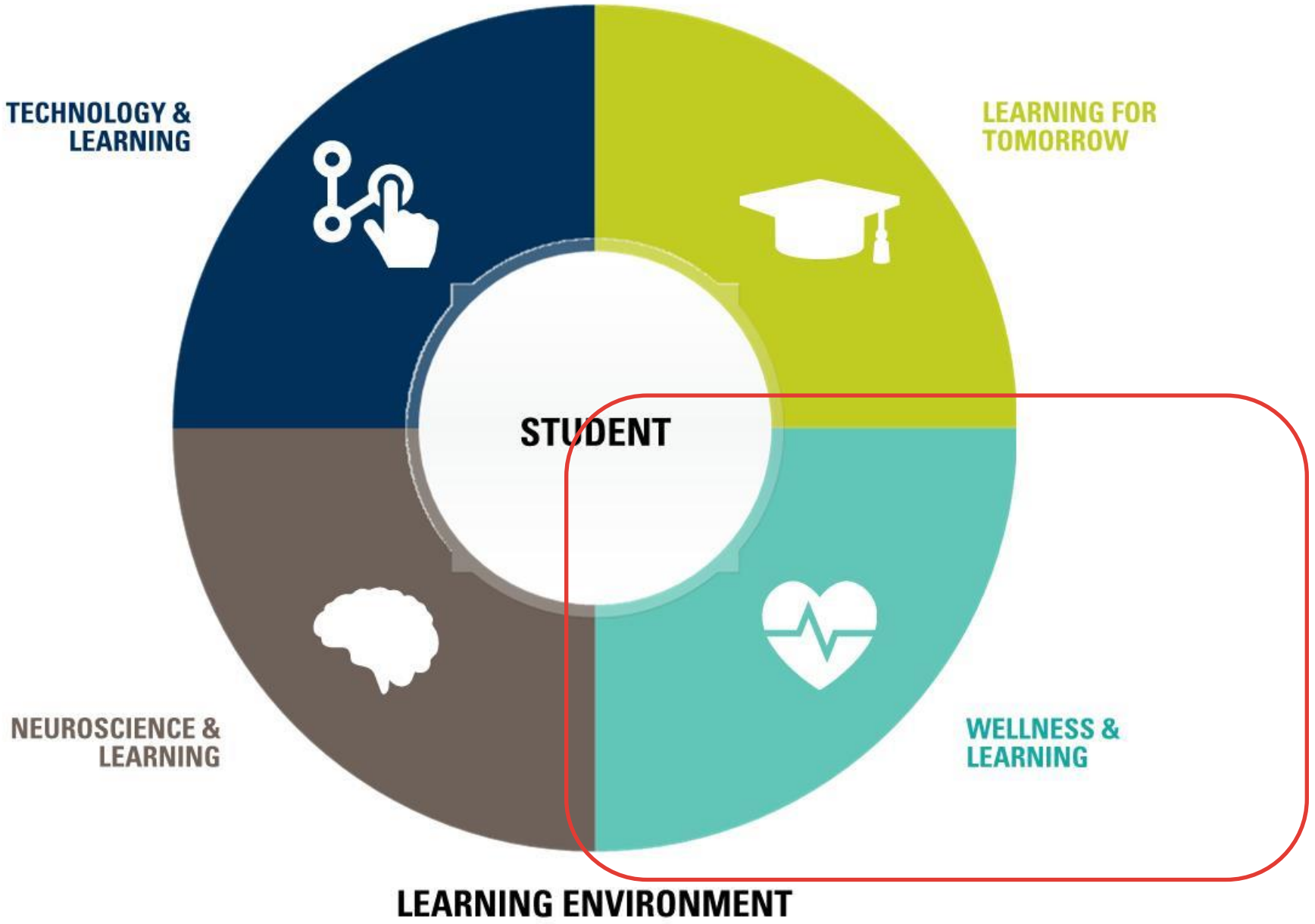




"IN THE CLASSROOM, **THE MORE WAYS THE MATERIAL TO BE LEARNED** IS INTRODUCED TO THE BRAIN AND REVIEWED, THE MORE DENDRITE PATHWAYS OF ACCESS WILL BE CREATED"

- JUDY WILLIS, IGNITE LEARNING

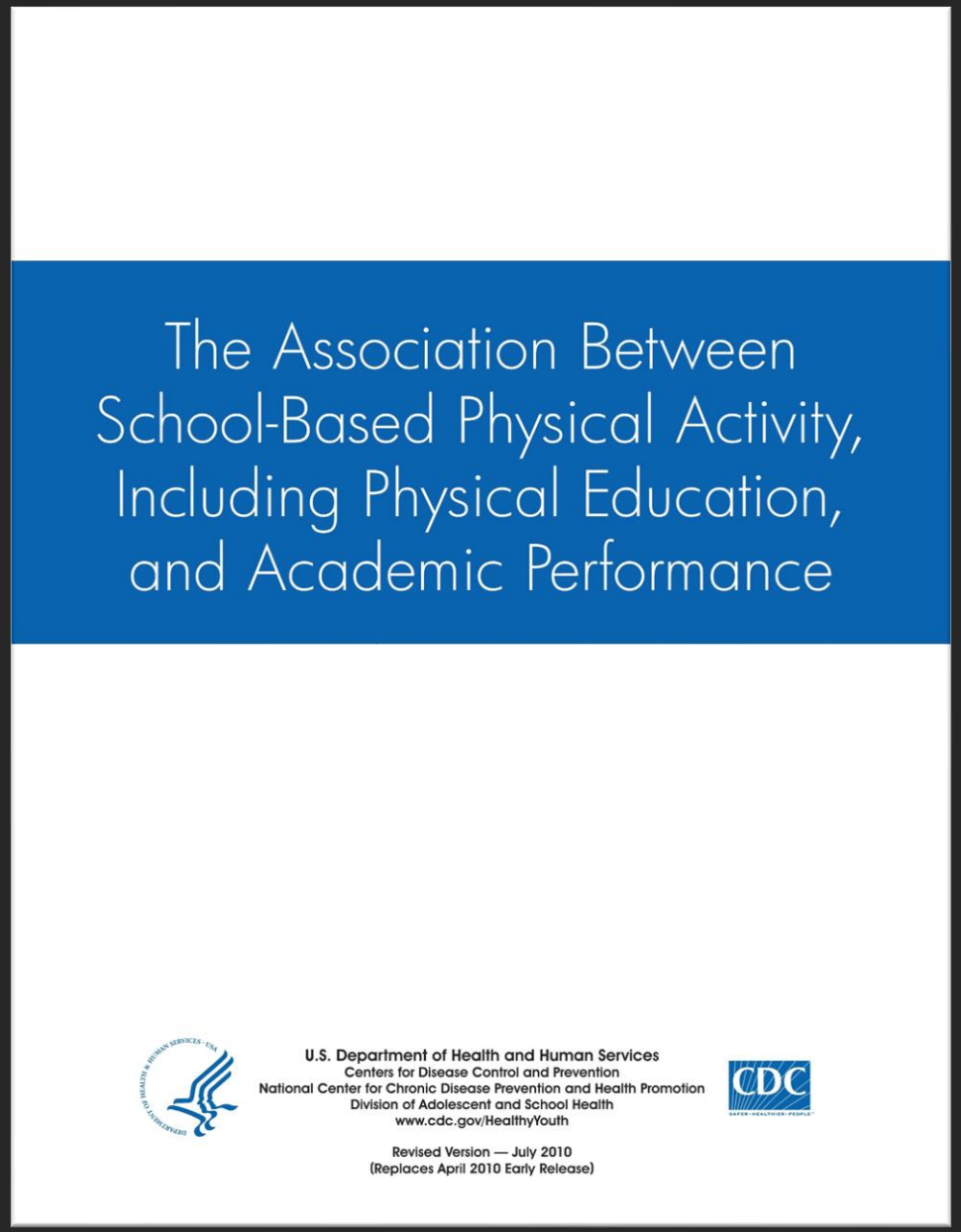
LEARNING FOR THE IMAGINATION AND INNOVATION ECONOMY



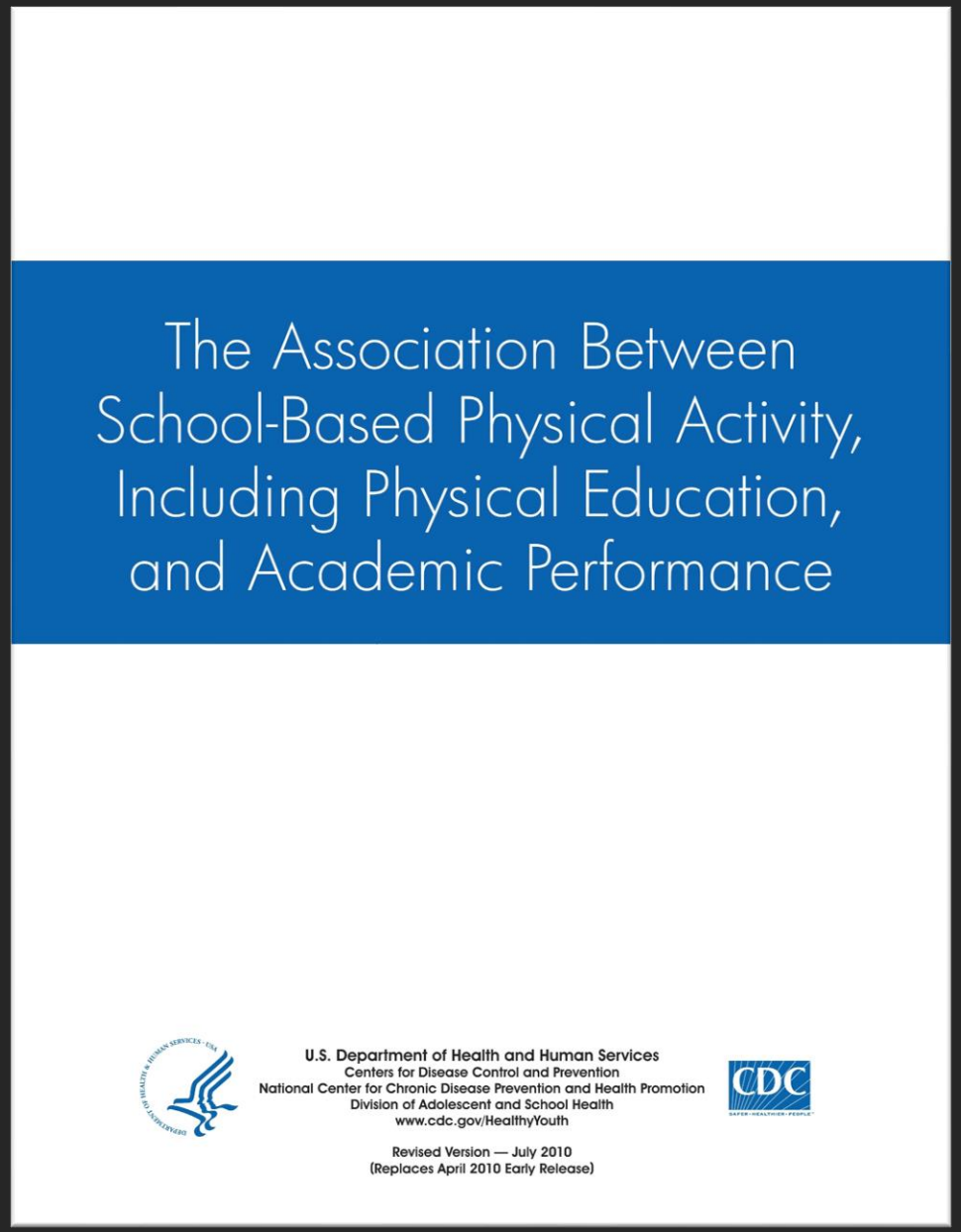
WELLNESS

MOVEMENT & THE BRAIN

NEUROGENERATION & NEUROPLASTICITY



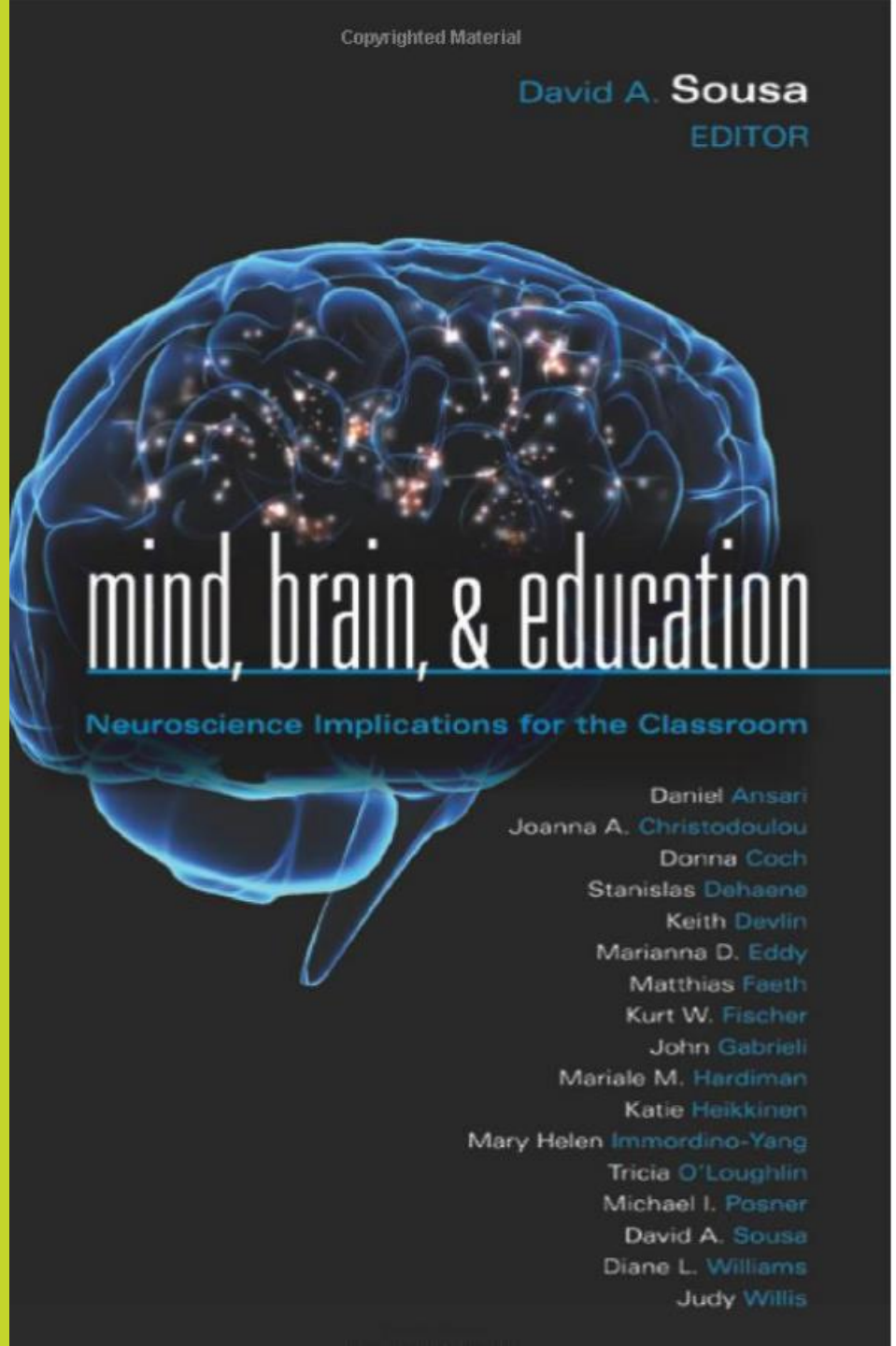
“There is a direct relationship between student’s academic achievement and health-related behaviors.”



“WELL features in learning spaces, such as promoting physical fitness, providing mental health support and education, reducing air and noise pollution, and engaging teachers and community members optimizes student well-being and academic performance, helping them reach their full potential”

“All eight studies found one or more positive associations between recess and indicators of cognitive skills, attitudes, and academic behavior; none of the studies found negative association”

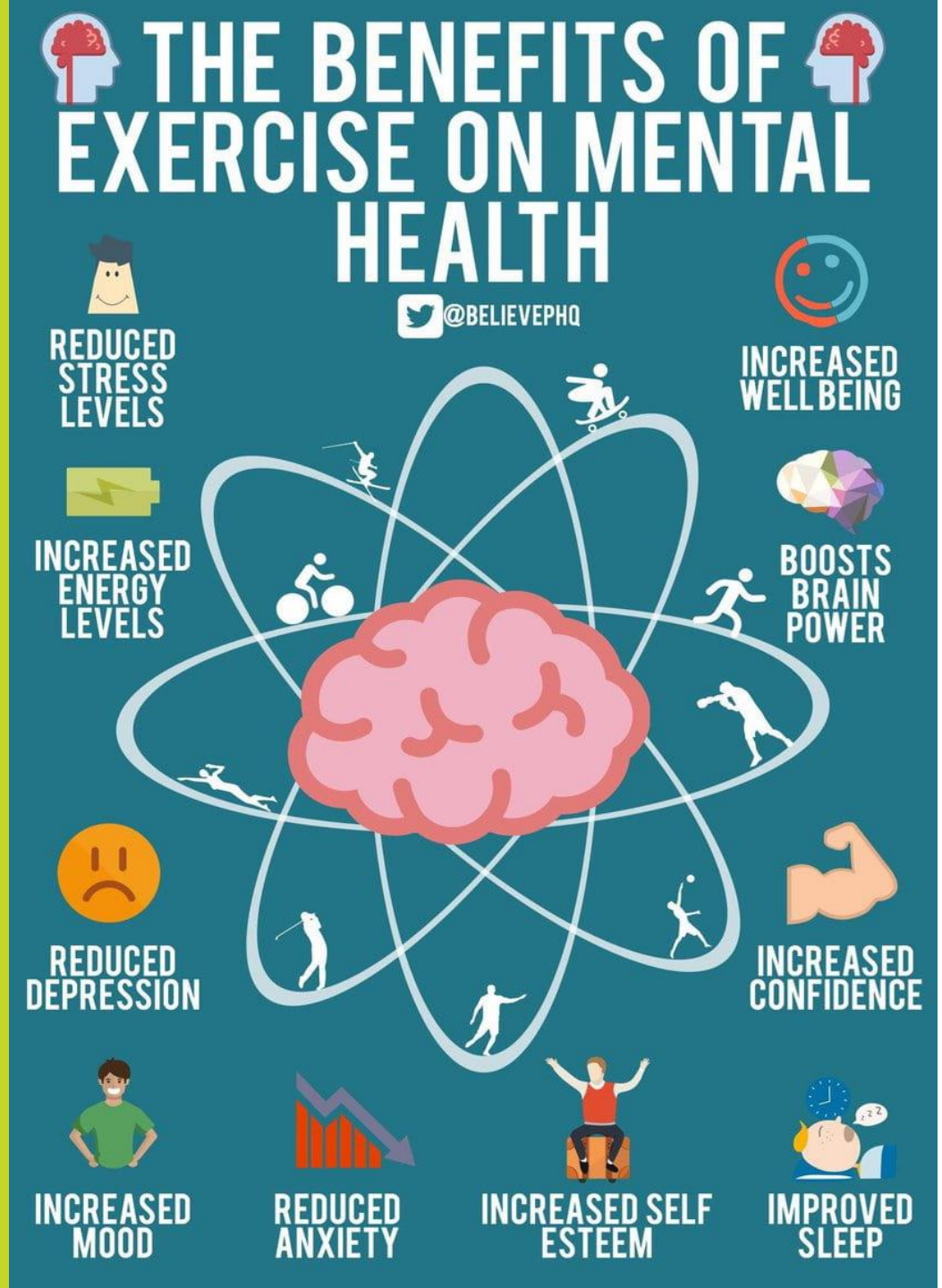
“Eight of the nine studies found positive associations between classroom-based physical activity and indicators of cognitive skills and attitudes, academic behavior, and academic achievement”



"The typical Classroom Setting where students 'sit and get' was challenged by research findings showing that the brain is more active when learners are moving around.

Movement brings additional fuel-carrying blood to the brain. It also allows the brain to access more long-term memory areas, thereby helping students make greater connections between new and prior learning."

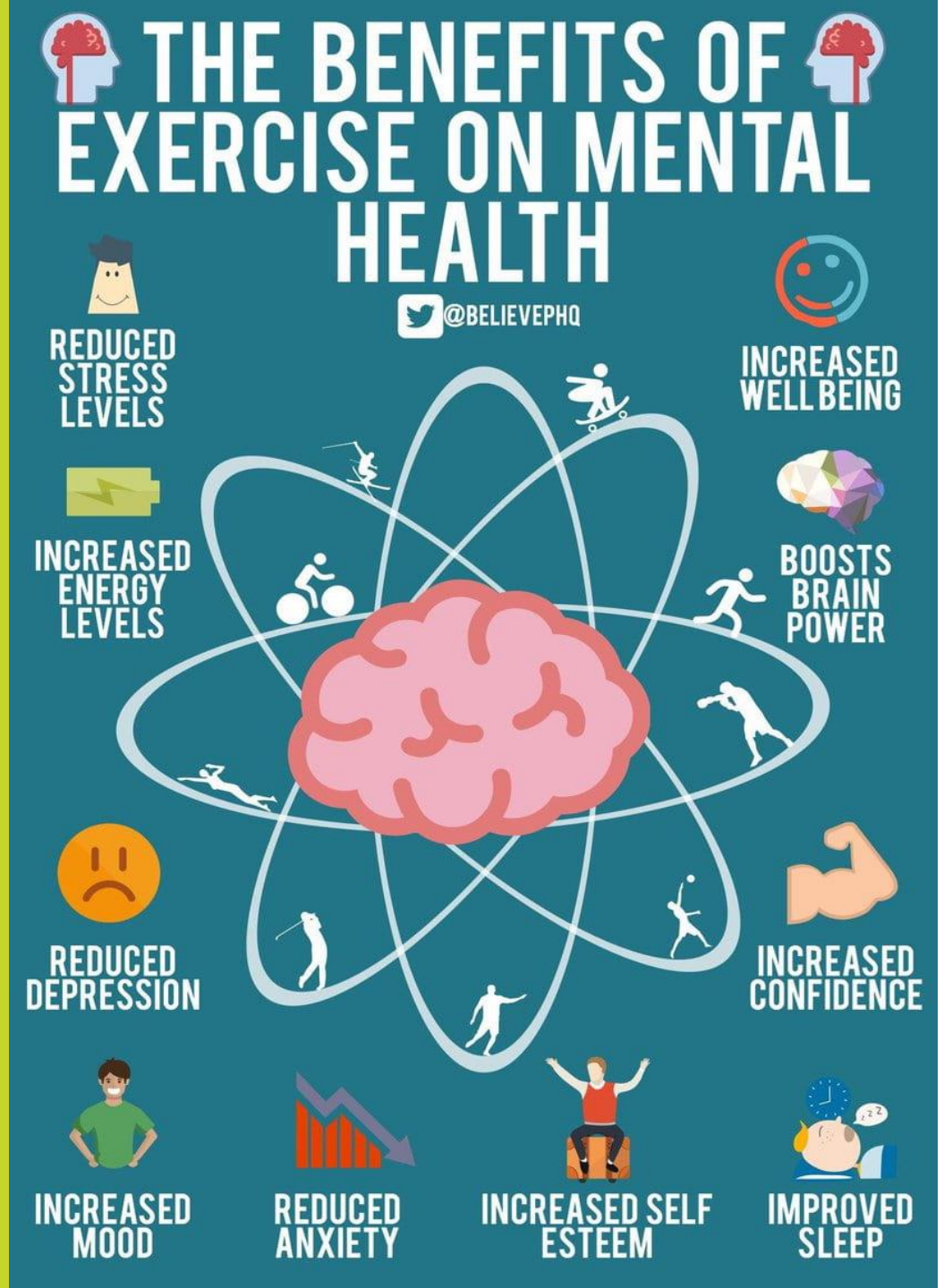
Dr. David A. Souza
Mind, Brain, & Education, pg 15



How Physical Activity Affects The Brain

Cognitive skills and motor skills appear to develop through a dynamic interaction. Research has shown that physical movement can affect the brain's physiology by increasing:

- Cerebral capillary growth.
- Blood flow.
- Oxygenation.
- Production of neurotrophins.
- Growth of nerve cells in the hippocampus (center of learning and memory)
- Neurotransmitter levels.
- Development of nerve connections
- Density of neural network.
- Brain tissue volume.



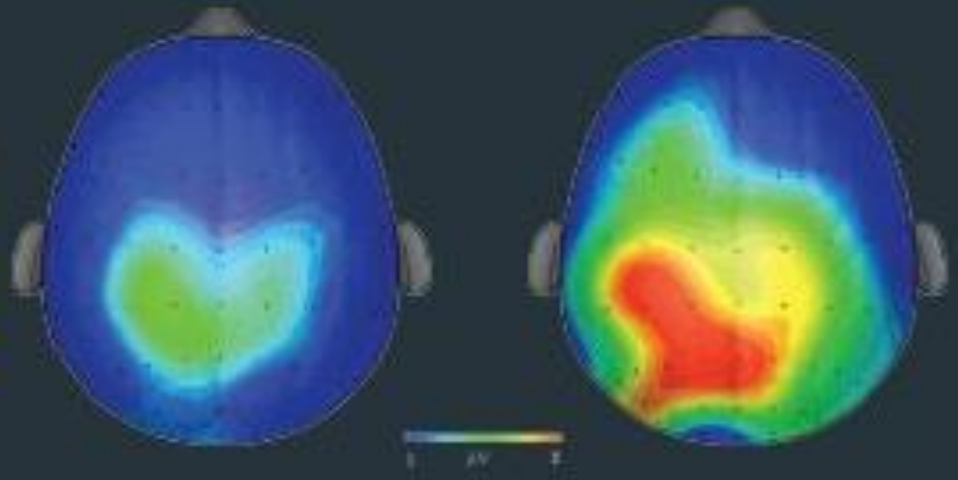
How Physical Activity Affects The Brain

These physiological changes may be associated with:

- Improved attention.
- Improved information processing, storage, and retrieval.
- Enhanced coping.
- Enhanced positive affect.
- Reduced sensations of cravings and pain.

Physical activity boosts brain activity

BRAIN AFTER 20 MINUTES OF **SITTING**



BRAIN AFTER 20 MINUTES OF **WALKING**

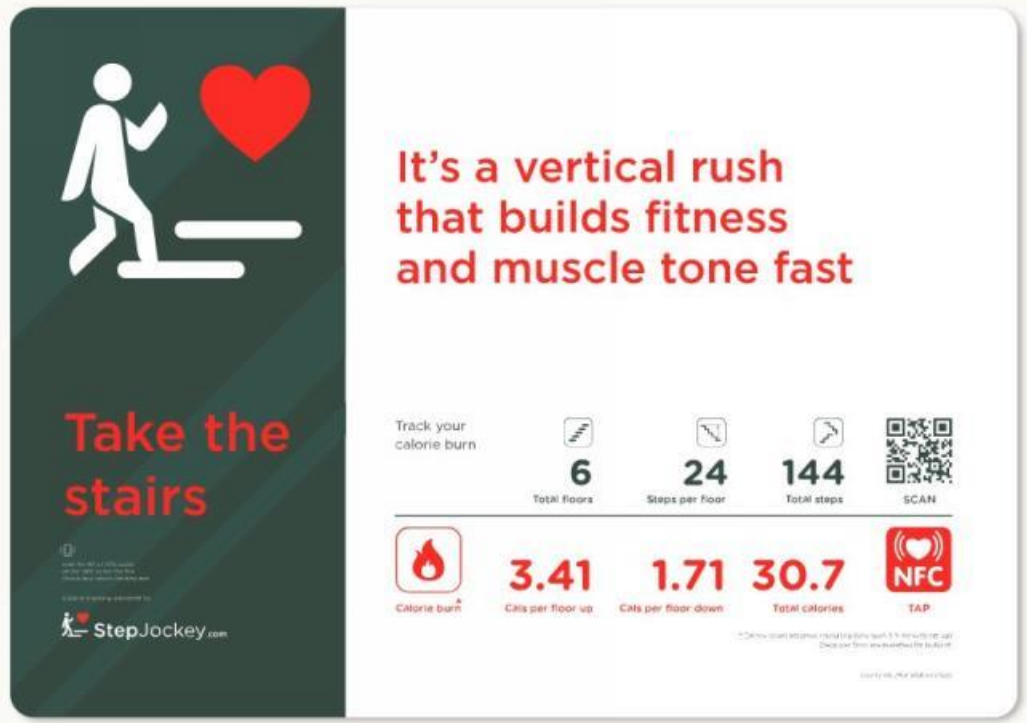
LOWER BRAIN ACTIVITY **HIGHER BRAIN ACTIVITY**

Children's average neural activity while taking a test after 20 minutes of sitting compared to 20 minutes of walking.

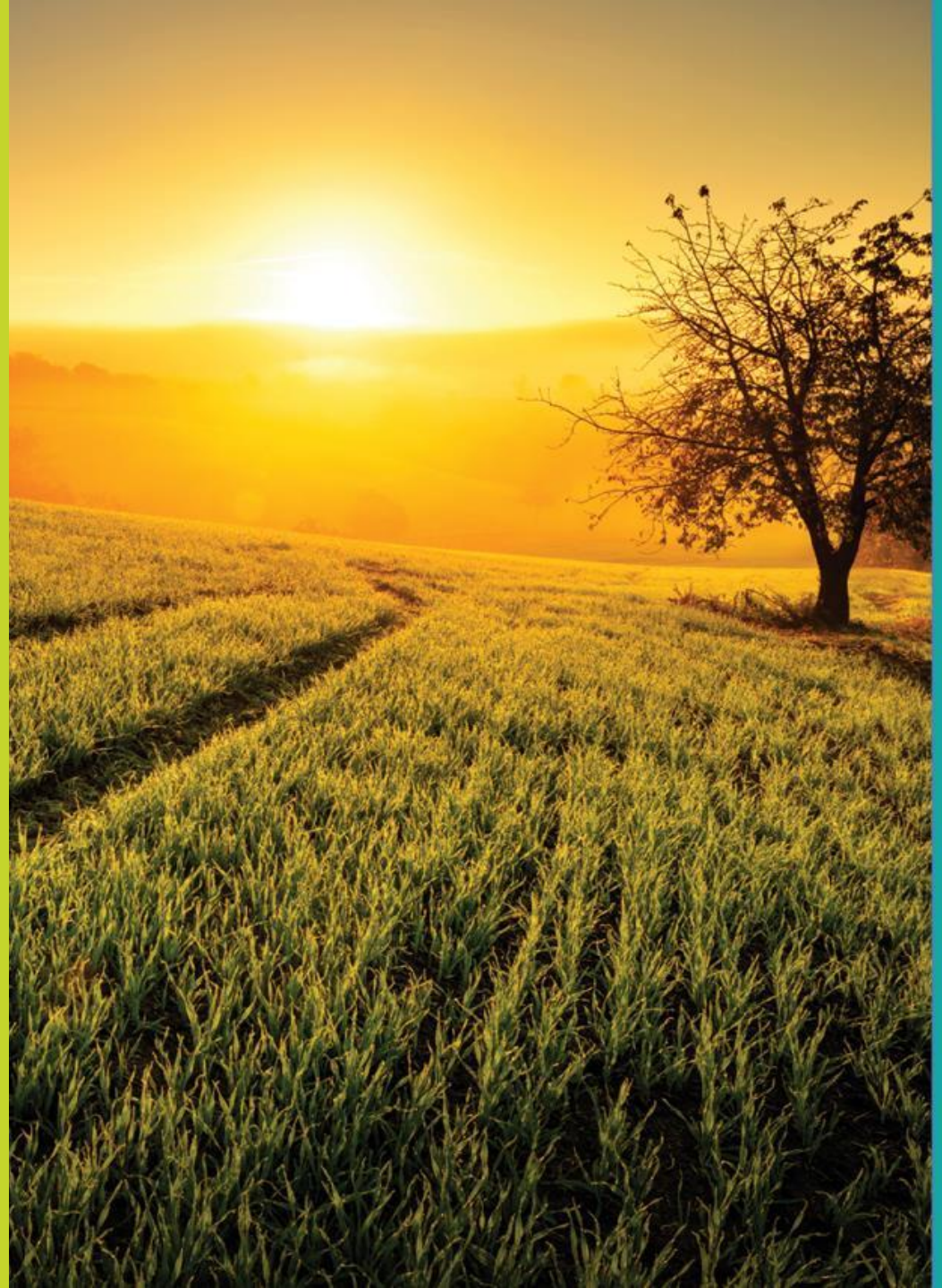
StrongNation.org

52%

MORE LIKELY TO TAKE STAIRS AFTER SEEING SIGNS



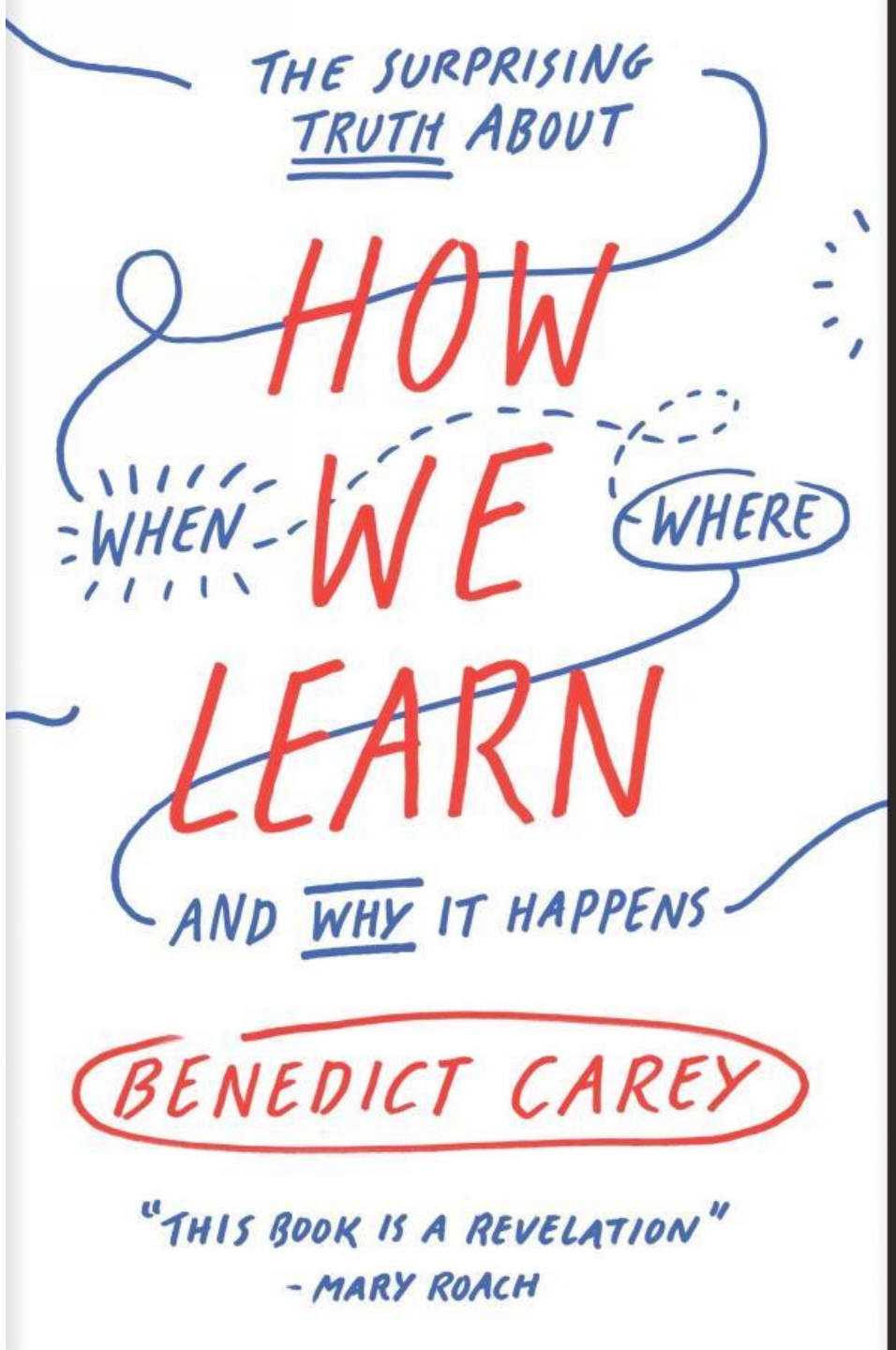
WELLNESS



TIME & THE BRAIN

CHRONOBIOLOGY & CIRCADIAN RHYTHM

1



"

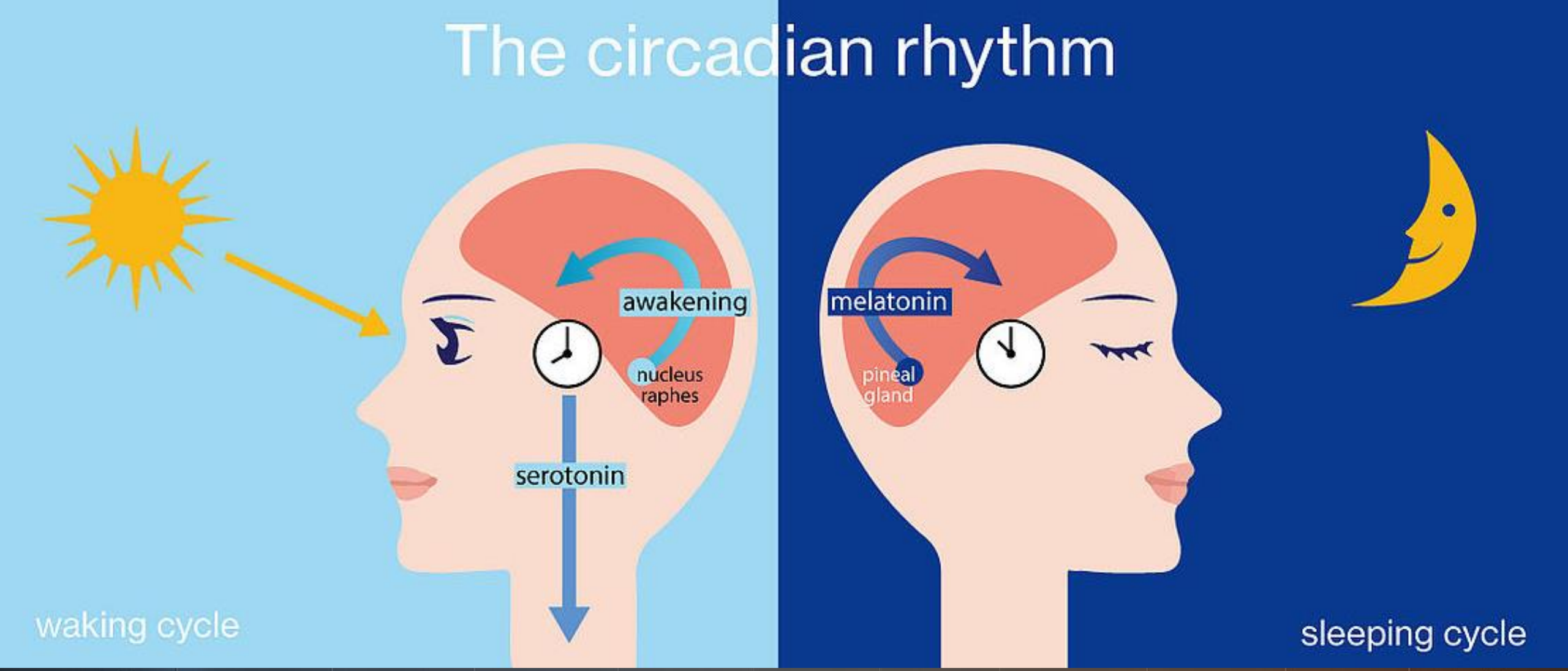
The Brain is sensitive to mood, to timing, to circadian rhythms, as well as to location, environment.

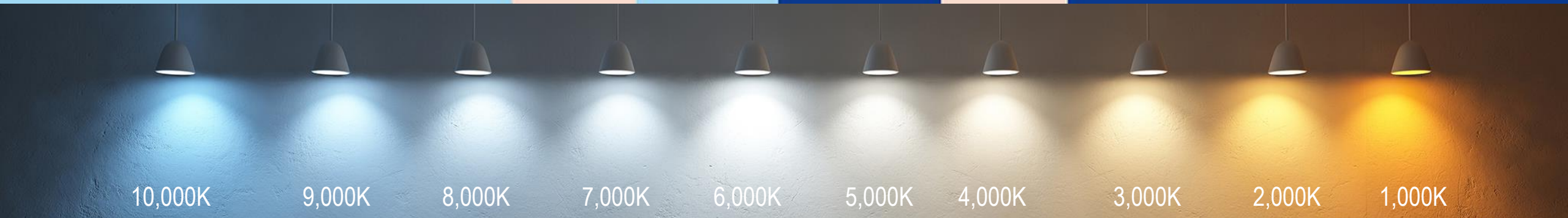
It registers far more than we are conscious of and often adds previously unnoticed details when revisiting a memory or learned fact….

"

Benedict Carey
How We Learn, pg 20

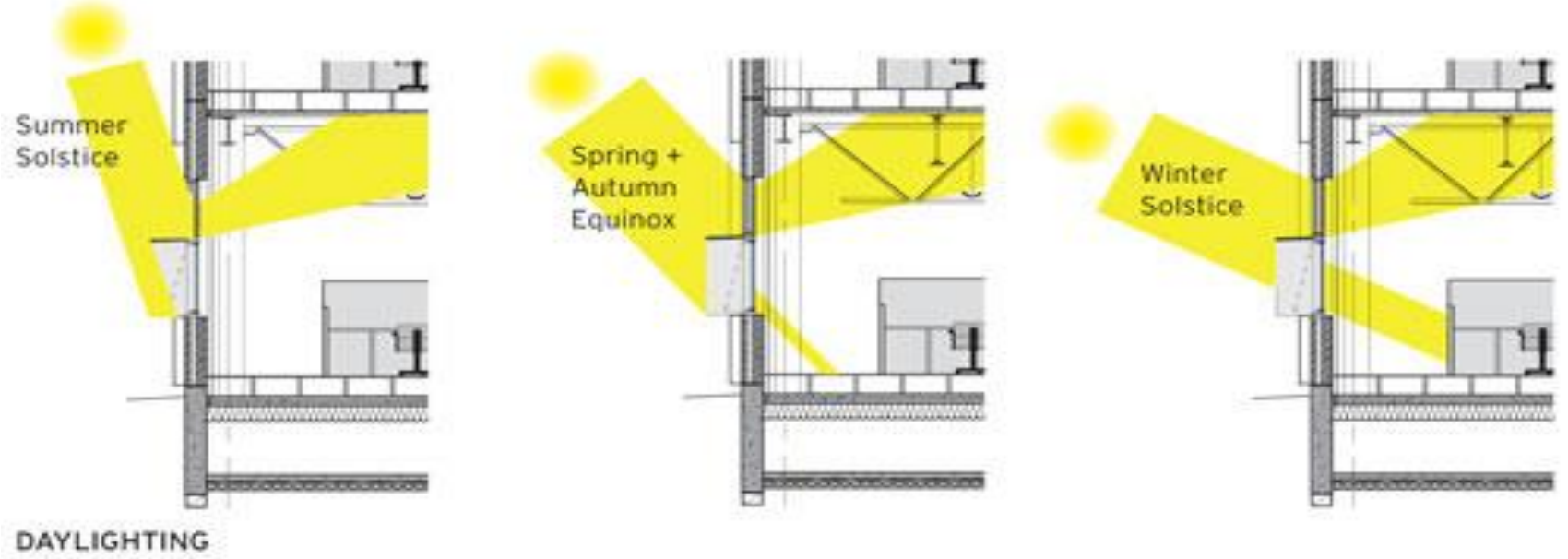
The circadian rhythm

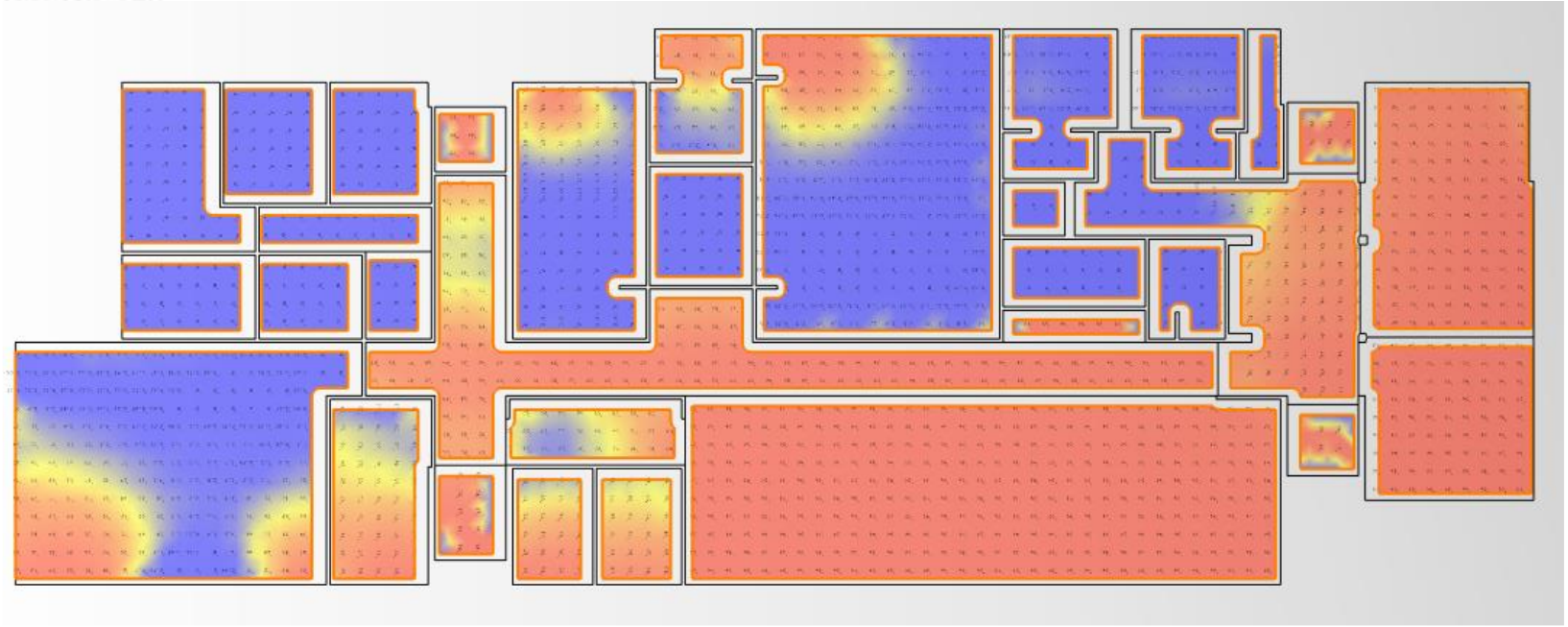




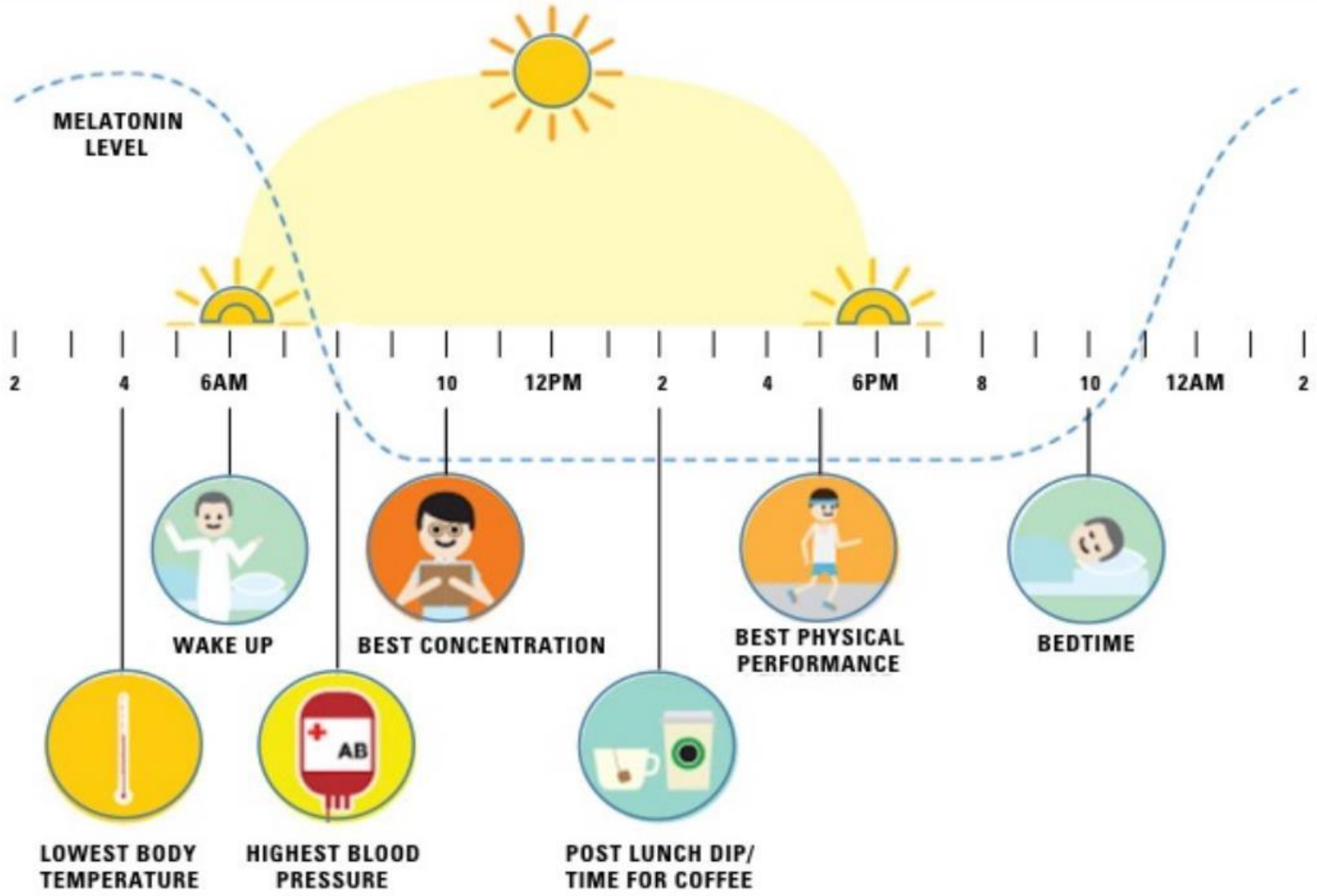
WELLNESS

DAYLIGHTING DESIGN





MELANOPIC LIGHT & CIRCADIAN RHYTHM



WELLNESS

SLEEP & THE BRAIN

1

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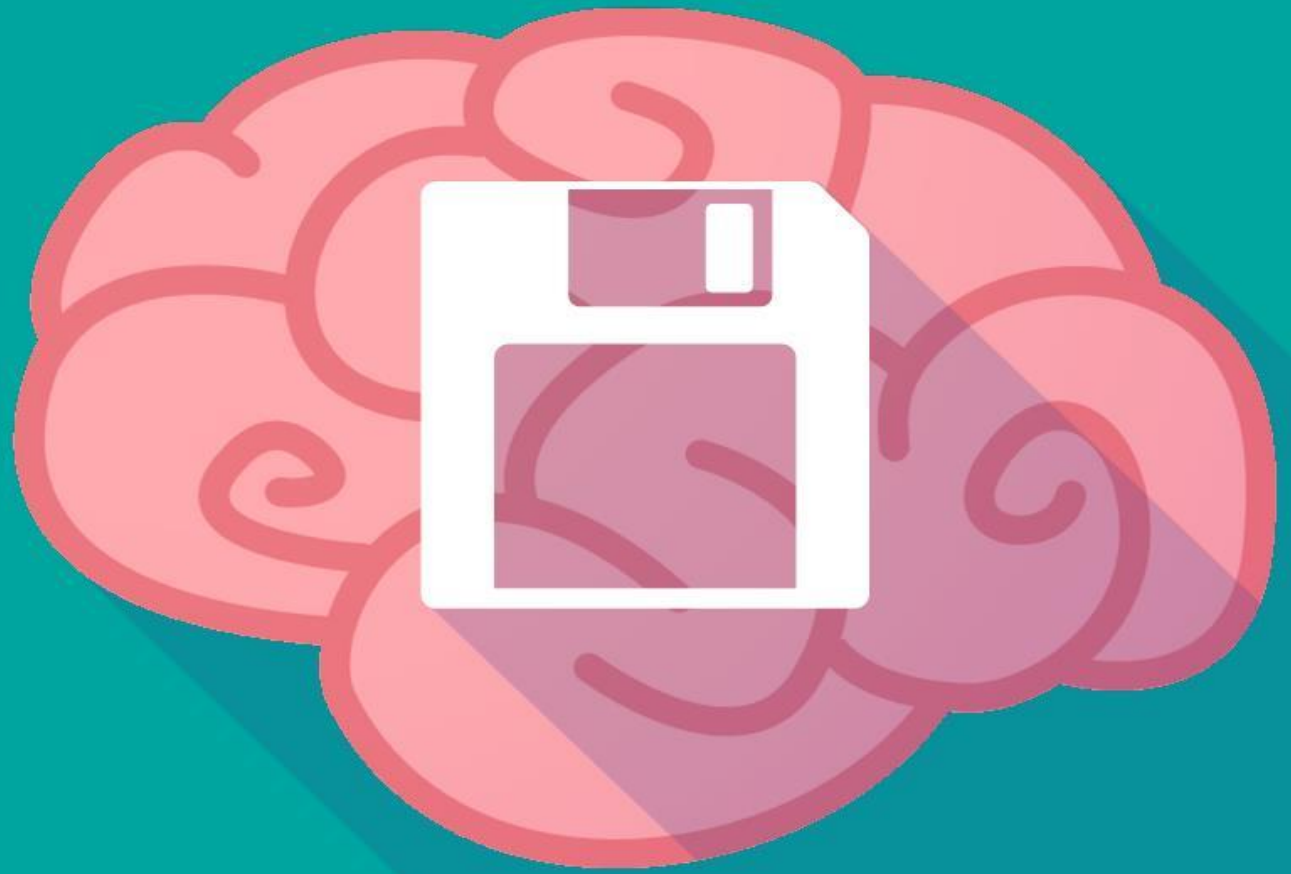
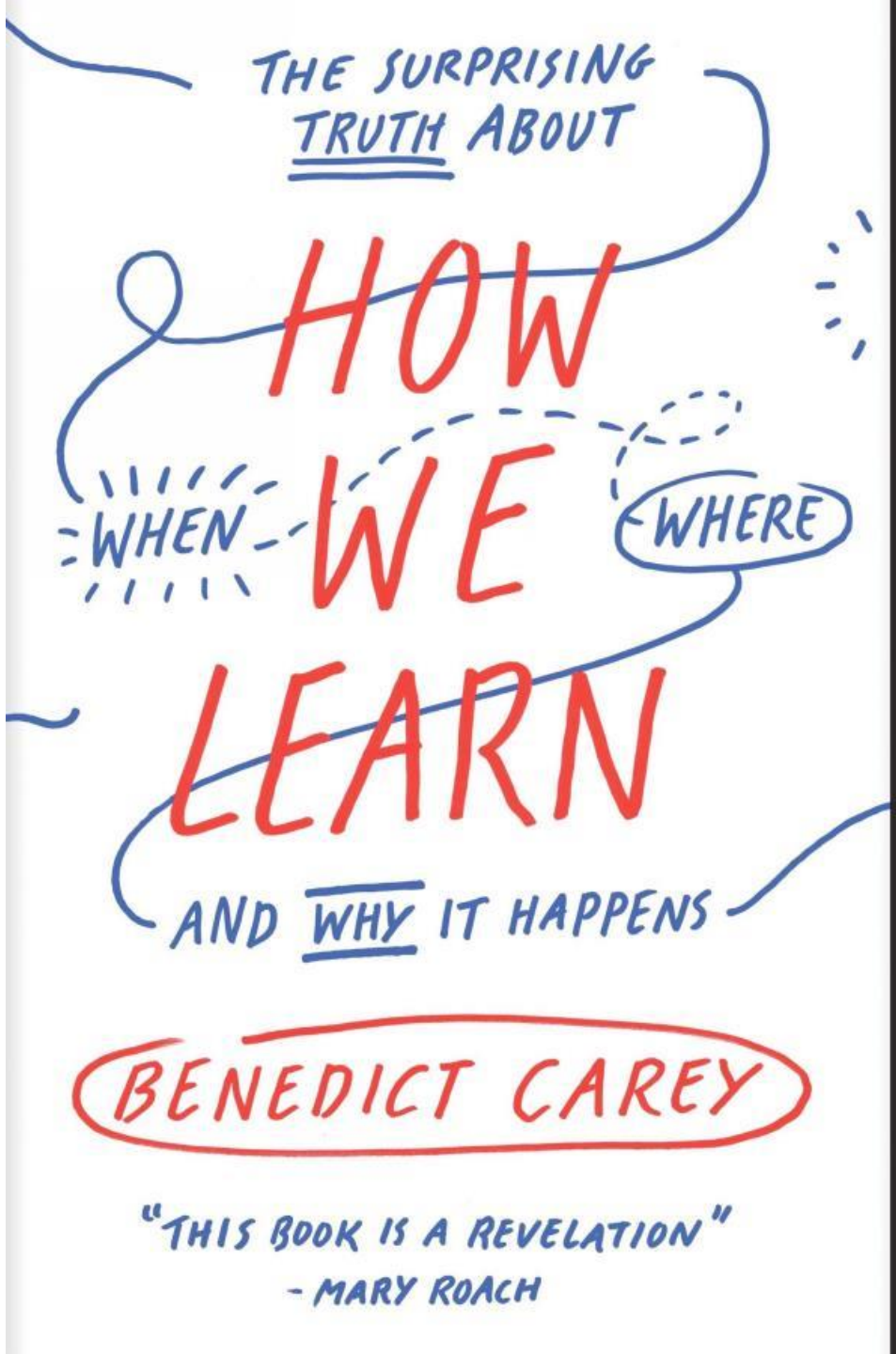


SHORT TERM MEMORIES BECOME LONG TERM MEMORIES THROUGH SLEEP



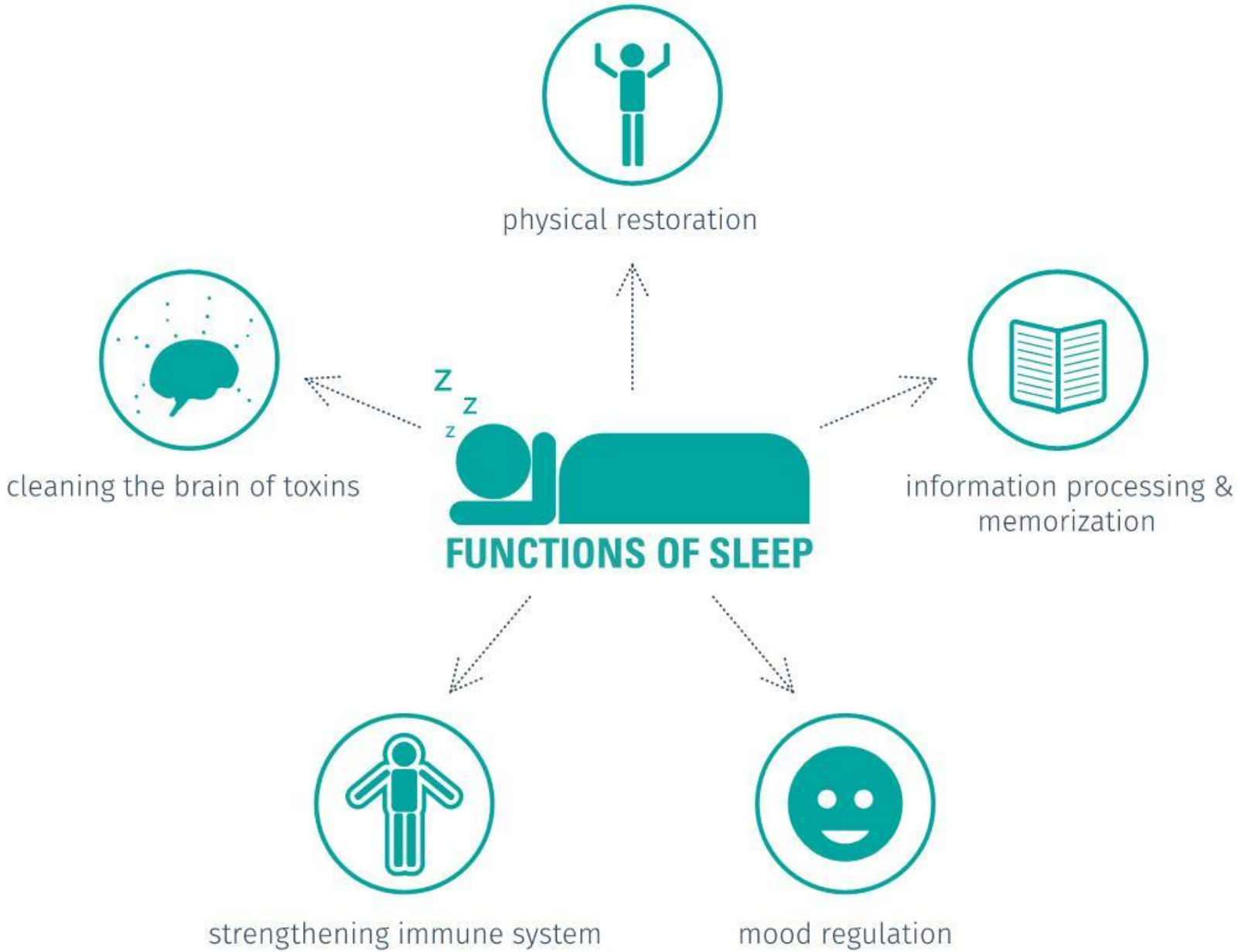
"

… It [the brain] works hard at night, during sleep, searching for hidden links and deeper significance in the day's events. It has strong preference for meaning over randomness.

If the brain is a learning machine, then it is an eccentric one. And it performs best when its quirks are exploited.

"

Benedict Carey
How We Learn, pg 20


physical restoration
cleaning the brain of toxins
information processing & memorization
FUNCTIONS OF SLEEP
strengthening immune system
mood regulation

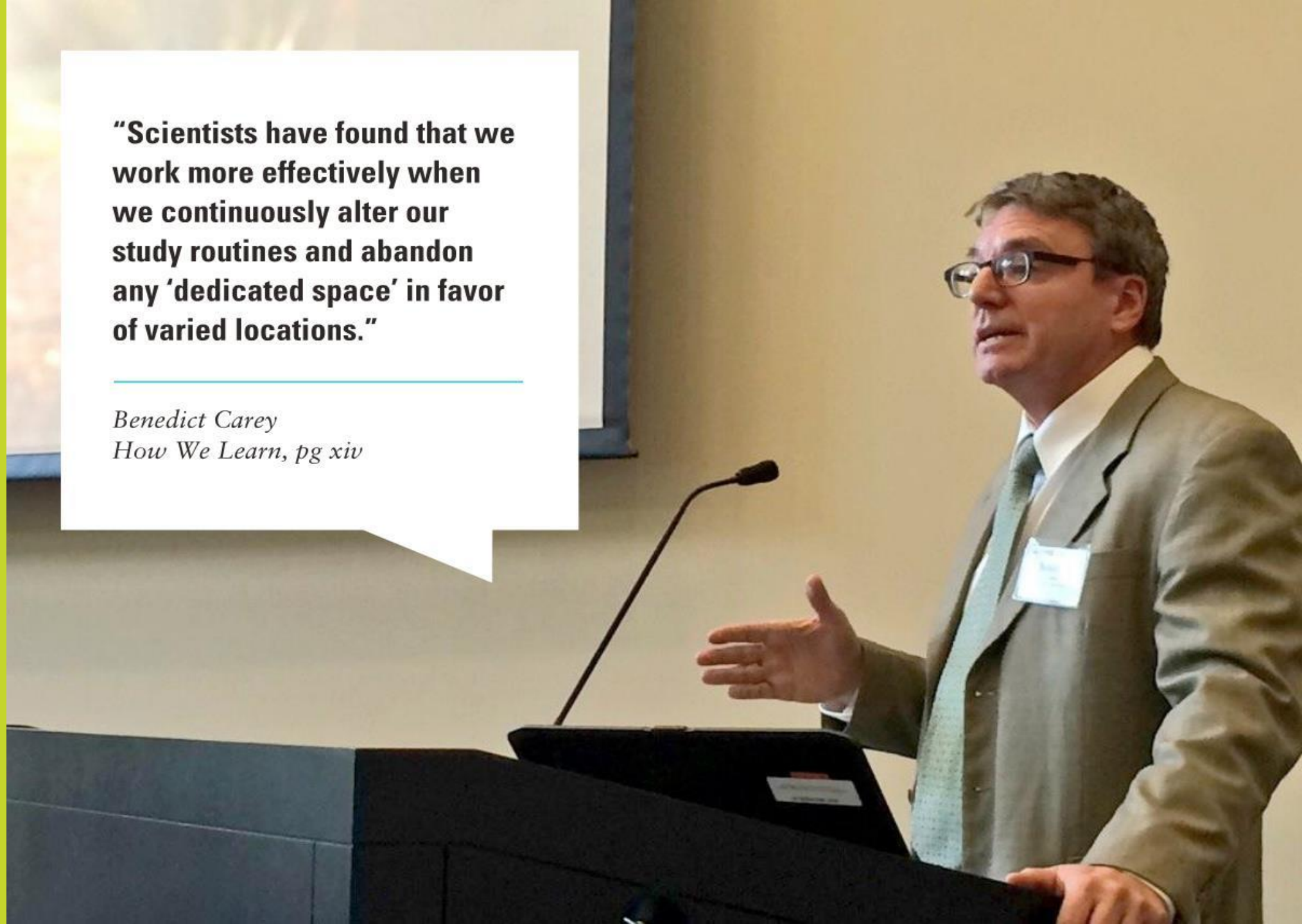
TREND

SPATIAL VARIETY

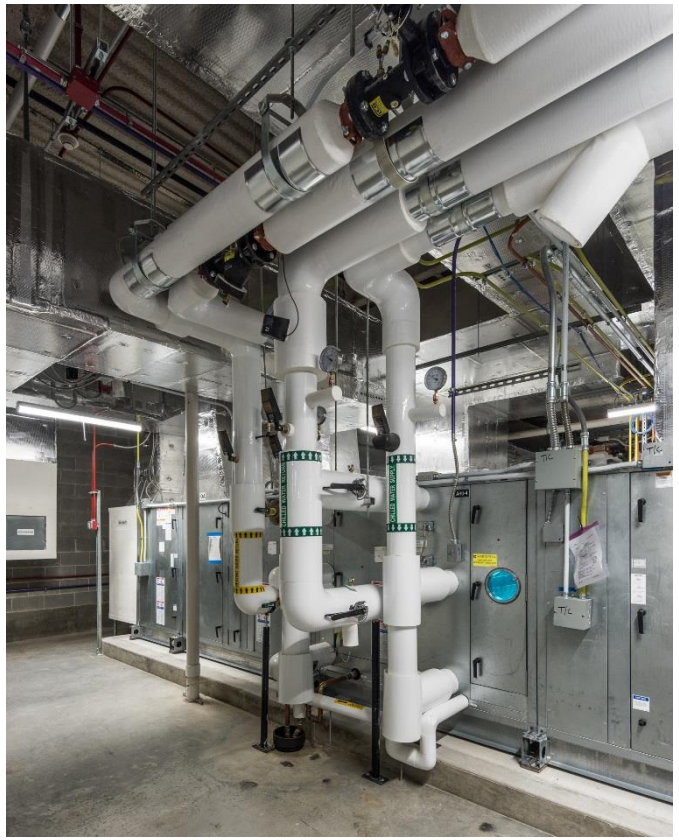
THE NOVELTY NEURON IN OUR BRAIN IS CONSTANTLY LOOKING FOR SOMETHING TO DO. PROVIDING SPACES THAT SUIT A VARIETY OF NEEDS - BASED ON THE ACTIVITY AND PROCESSES TAKING PLACE IN THE SPACE - HELPS TO KEEP US ENGAGED, AND HOLD OUR ATTENTION.

"Scientists have found that we work more effectively when we continuously alter our study routines and abandon any 'dedicated space' in favor of varied locations."

Benedict Carey
How We Learn, pg xiv



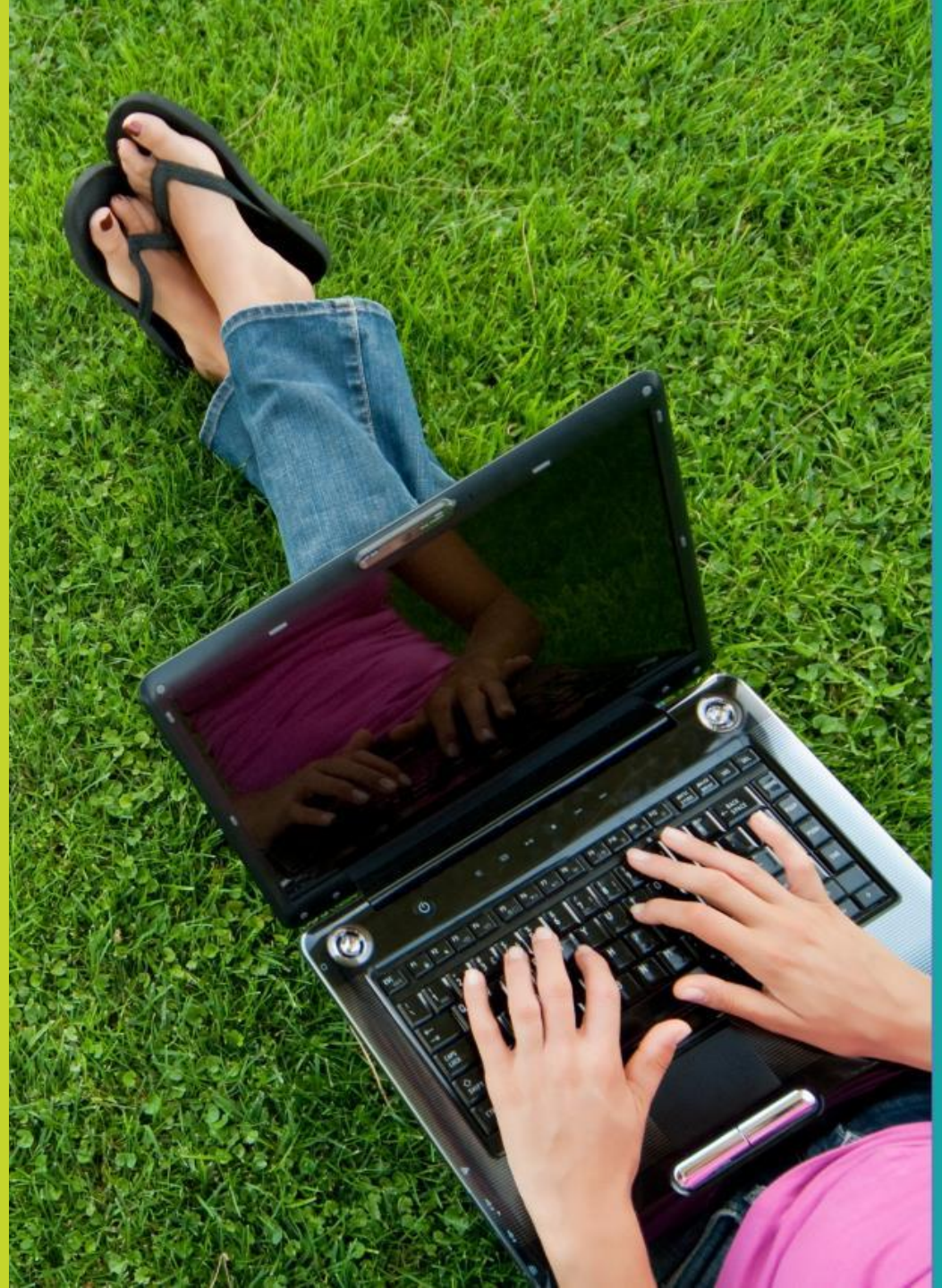
ACOUSTICS



HVAC Background Noise

Sound Transmission

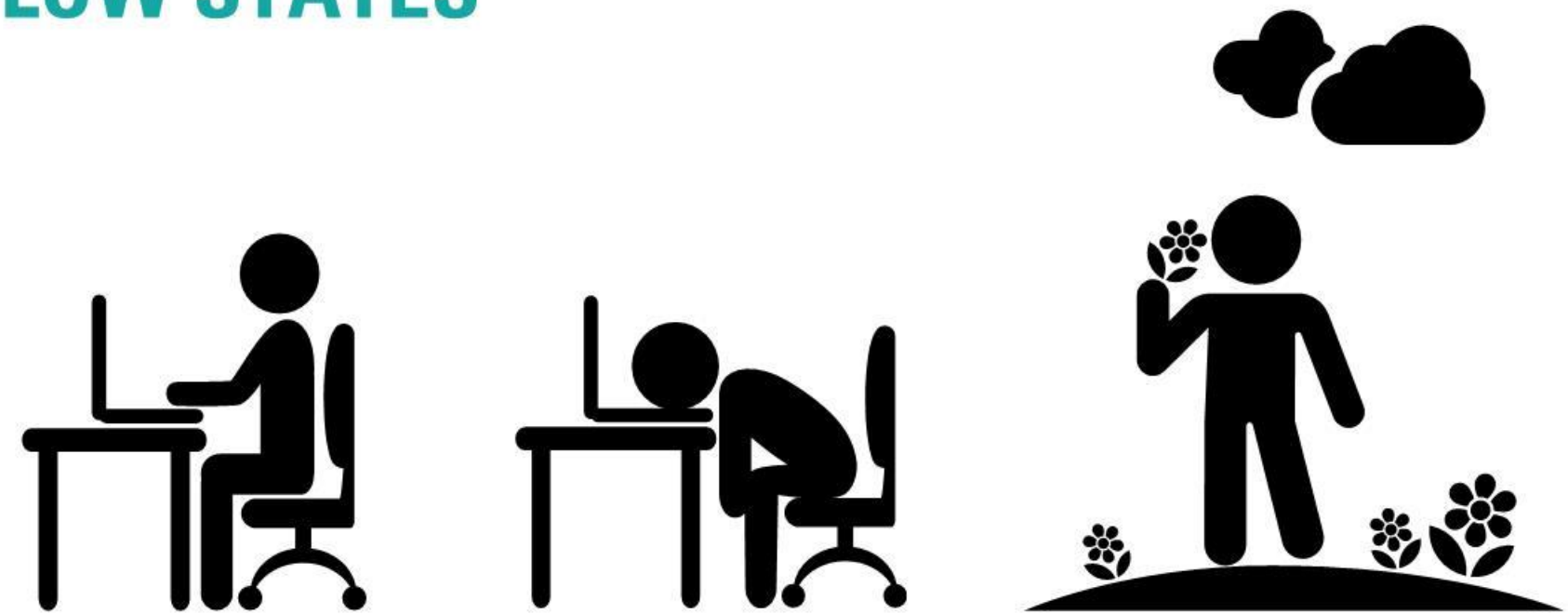
WELLNESS



RESTORATION SPACE

ATTENTION RESTORATION THEORY

FLOW STATES



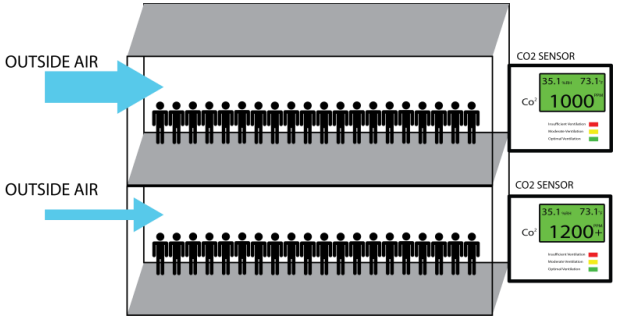
DIRECT ATTENTION

DIRECT ATTENTION FATIGUE

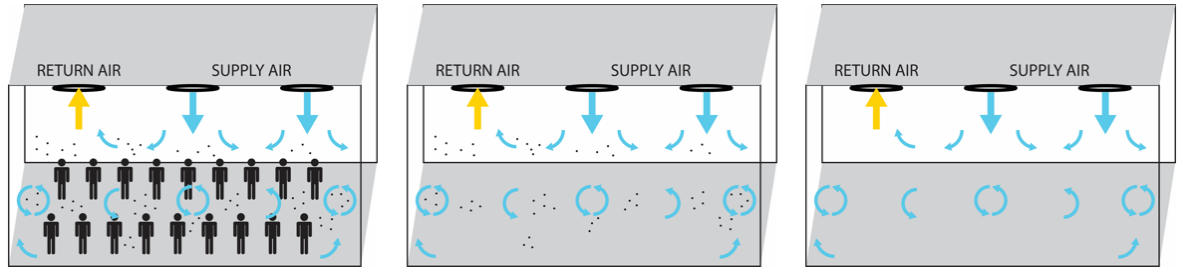
ATTENTION RESTORATION

WELLNESS

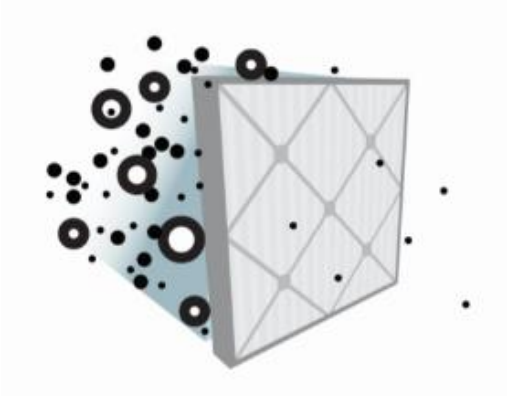
INDOOR AIR QUALITY



Increased Ventilation



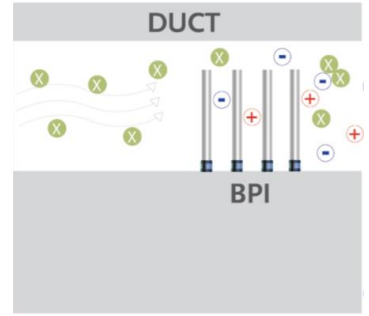
Building Flush



MERV 13+

Filters

UV Lights



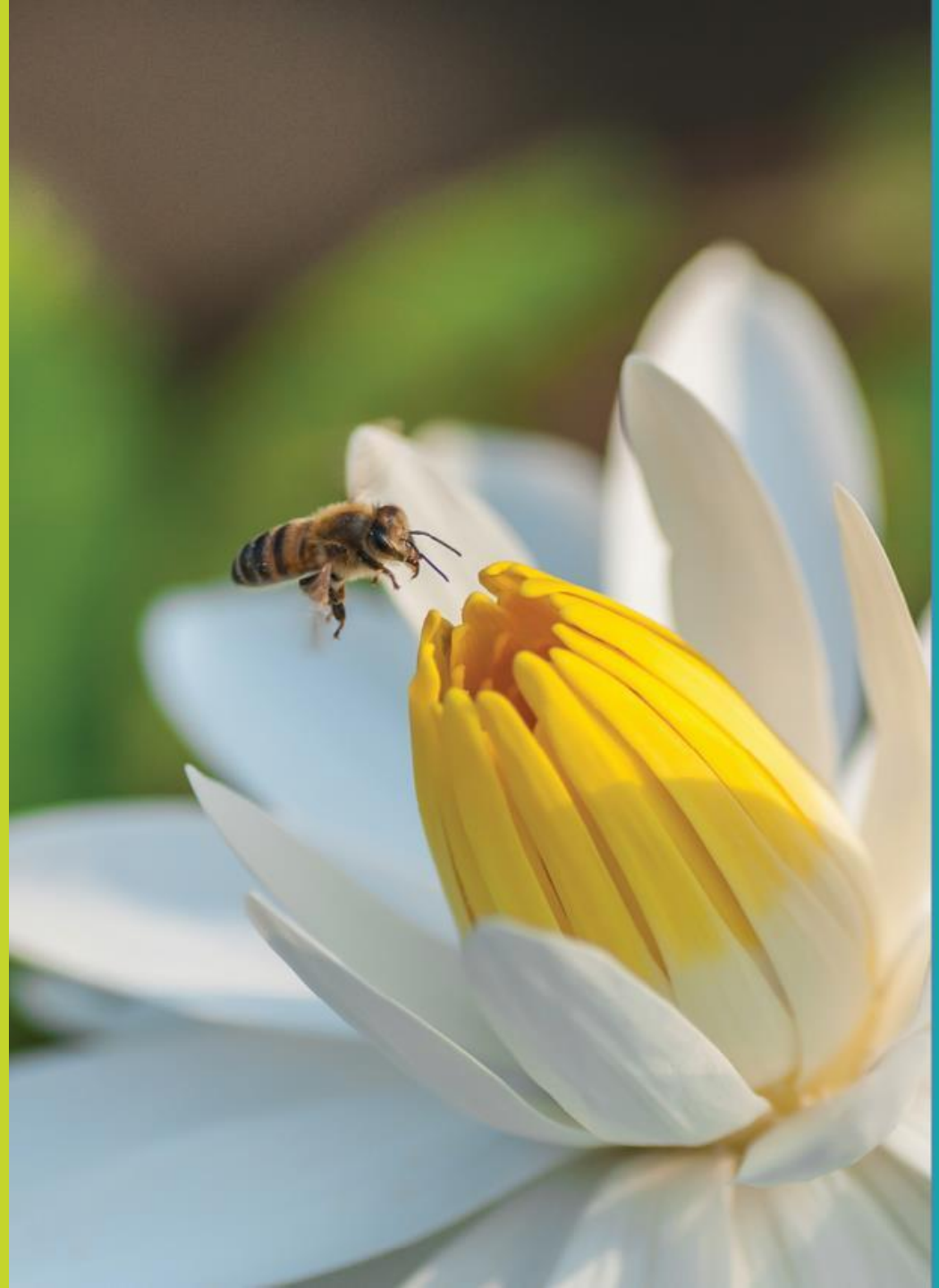
Bipolar

Ionization

Humidity

Control

WELLNESS



NATURE & THE BRAIN

BIOPHILIC DESIGN

WELLNESS

NATURE DEFICIT DISORDER

TREND

NATURAL VIEWS

STUDIES HAVE SHOWN THAT HUMANS ARE CALMED BY VIEWS OF NATURE. IT IS VESTIGE OF OUR EVOLUTIONARY MEMORY. KEEPING THE WINDOW LINE OPEN TO OUTSIDE VIEWS REDUCESS STRESS, IMPROVES HEART RATE AND HELPS PEOPLE RECHARGE THEIR ENERGY.

MIND-BODY CONNECTION

TREND
COMMUNITY

COMMUNITY IS IMPORTANT TO THE HEALTH AND WELL BEING OF ALL HUMANS. THE WELL BUILDING STANDARD FOCUSES ON CREATING INTERIOR AND EXTERIOR ENVIRONMENTS THAT ARE HEALTHY PLACES FOR PEOPLE TO GATHER.

"The social context is extremely important to learning, not only in infancy, but in school-aged children, who use the social brain when they're collaborating with one another, when they're studying how another person goes at it, when they're watching the eyes, even unconsciously, of their study partner as they work towards a solution together."

Dr. Patricia Kuhl
Learning and the Social Brain

"If you're not addressing the trauma, and the students are distracted, checked out, and falling increasingly behind, even the best curriculum won't matter."

Alex Shevrin Venet
The How and Why of Trauma-Informed Teaching

"To support students who have experienced trauma, start by flipping the traditional classroom paradigm:

Relationships have to come before content, insisted dozens of educators"

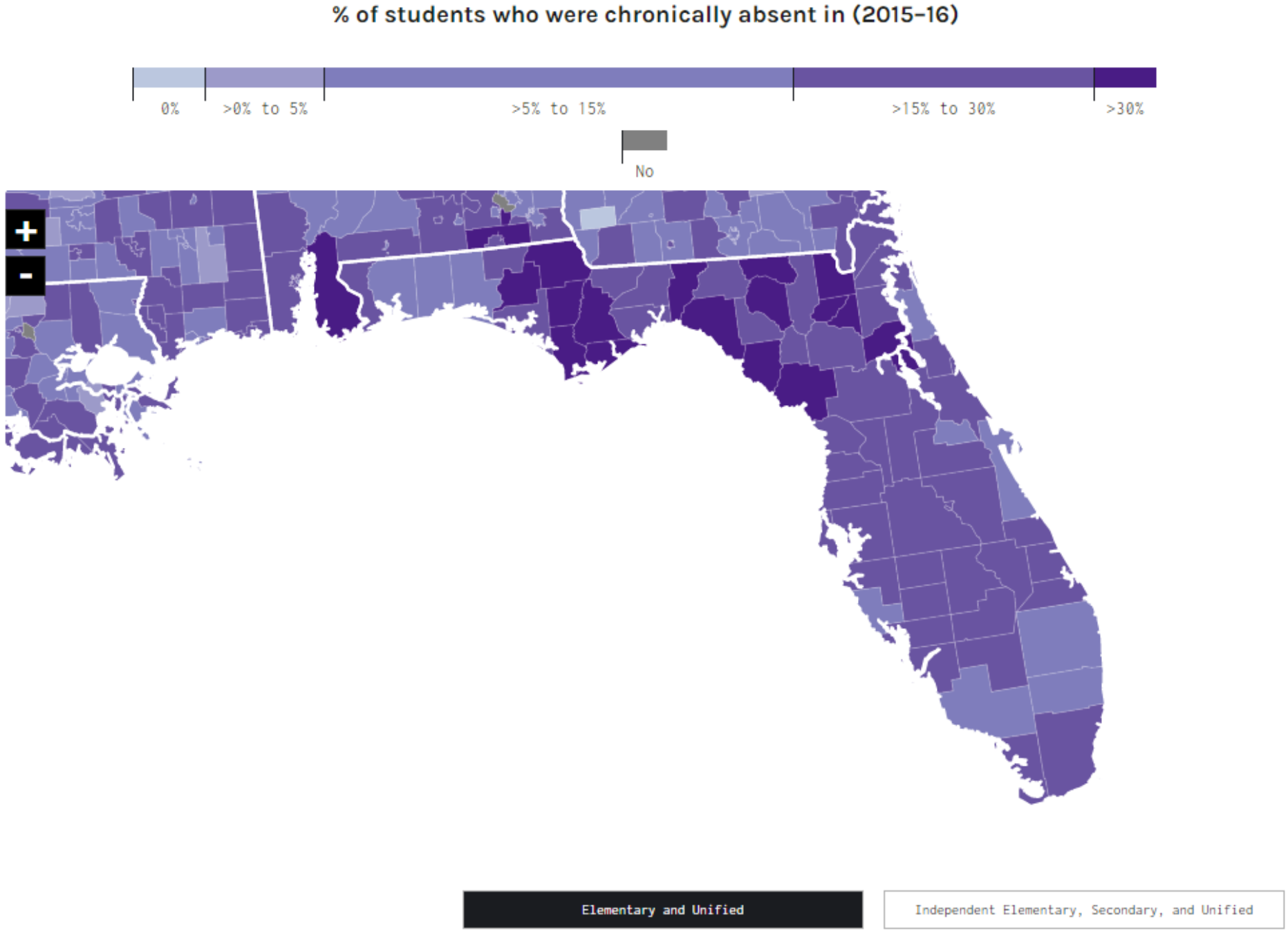
Alex Shevrin Venet
The How and Why of Trauma-Informed Teaching

22 million school days are lost to the common cold and 38 million to the flu. These numbers are startling, but they're also from 1996! Given that last year's flu was one of the worst on record and this year's is likely to eclipse it, the real numbers are likely higher.

The Real Cost of Illness-Related School Absenteeism | Nilfisk US

The annual national cost of teacher absenteeism is estimated at $25.2 billion, with $4 billion due to stipends for substitutes and associated administrative costs.

Chronic Absenteeism in the Nation's Schools (ed.gov)



* See map notes.

GUIDELINES

LEED

LEARDERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

ASHRAE

THE WELL BUILDING STANDARD™

SEVEN CONCEPTS FOR HEALTHIER BUILDINGS

WELL HEALTH-SAFETY RATING

STRATEGIES AND FEATURES

CLEANING AND SANITIZATION PROCEDURES

- Support Handwashing
- Reduce Surface Contact
- Improve Cleaning Practices
- Select Preferred Cleaning Products
- Reduce Respiratory Particle Exposure

EMERGENCY PREPAREDNESS PROGRAMS

- Develop Emergency Preparedness Plan
- Create Business Continuity Plan
- Plan for Healthy Re-Entry
- Provide Emergency Resources
- Bolster Emergency Resilience

HEALTH SERVICE RESOURCES

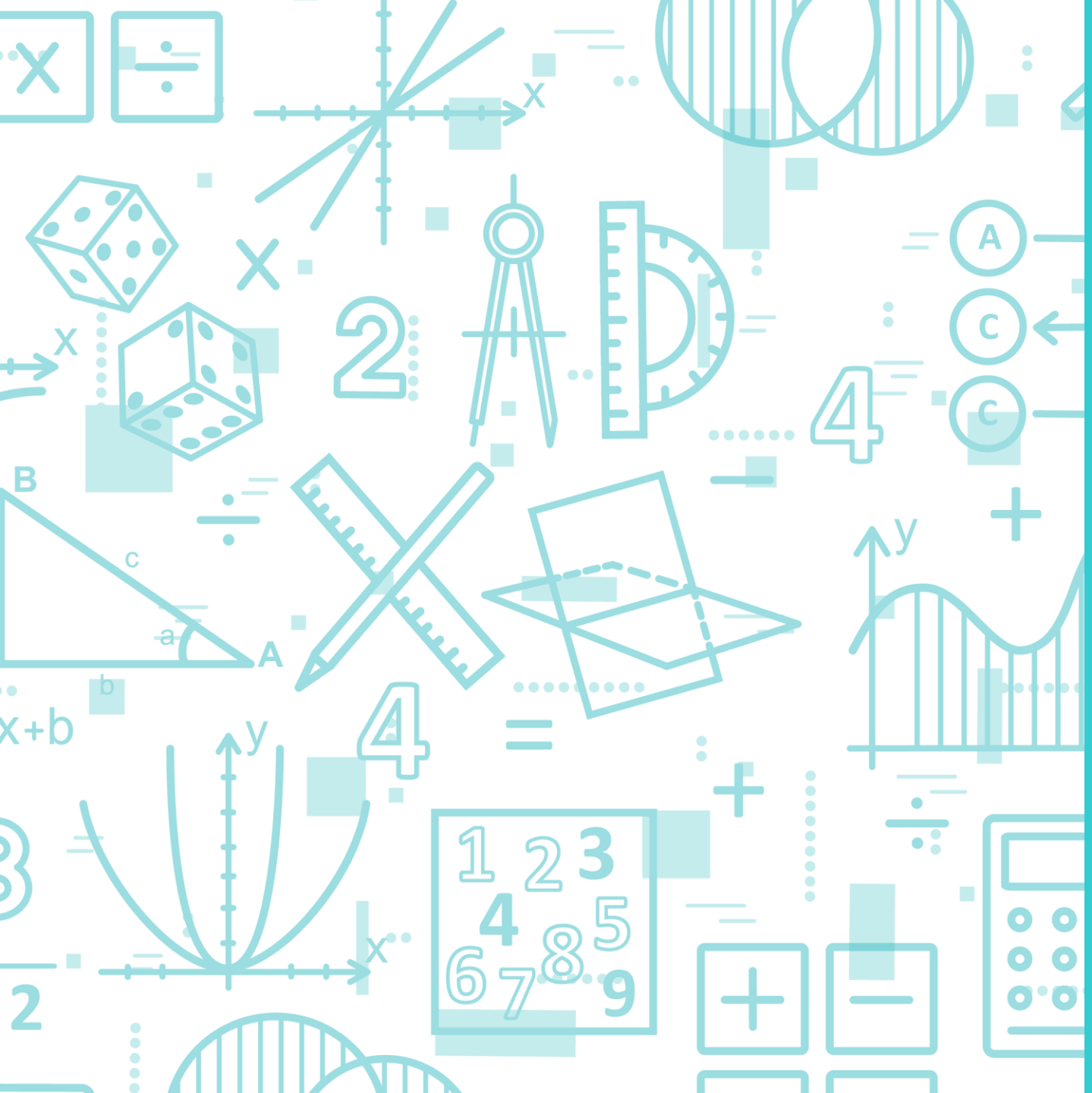
- Provide Sick Leave
- Provide Health Benefits
- Support Mental Health Recovery
- Promote Flu Vaccines
- Promote a Smoke-Free Environment

AIR AND WATER QUALITY MANAGEMENT

- Assess Ventilation
- Assess and Maintain Air Treatment Systems
- Develop Legionella Management Plan
- Monitor Air and Water Quality
- Manage Mold and Moisture

STAKEHOLDER ENGAGEMENT AND COMMUNICATION

- Promote Health and Wellness
- Share Food Inspection Information



2

SUSTAINABILITY / RESILIENCY / REGENERATIVE DESIGN

Log in to Poll Everywhere

To present live activities, please log in to your Poll Everywhere account in a separate window.

Launch log-in window

New Group

Visual settings

Edit

When poll is active, respond at **PollEv.com/heatherm550**

Text **HEATHERM550** to **22333** once to join

Do you track the EUI (Energy Use Intensity) of your buildings?

New Group

Visual settings

Edit

When poll is active, respond at **PollEv.com/heatherm550**

Text **HEATHERM550** to **22333** once to join

Have you implemented High Performance Strategies in your schools?

HIGH-PERFORMANCE / ZERO ENERGY DESIGN

THIS IS NOT A PASSING TREND

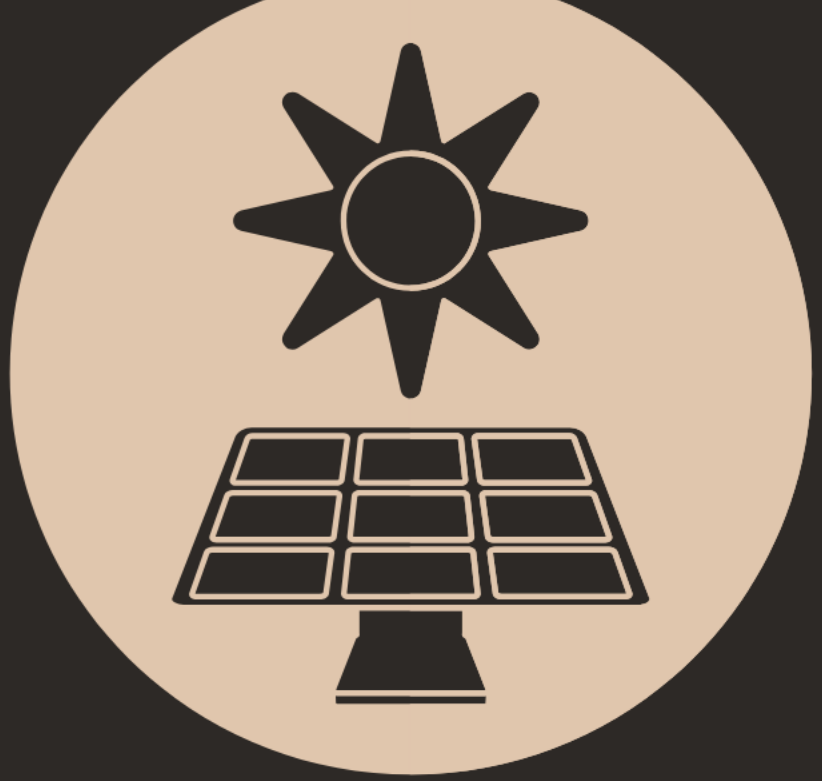
89%

of Americans are very concerned about the environment

93%

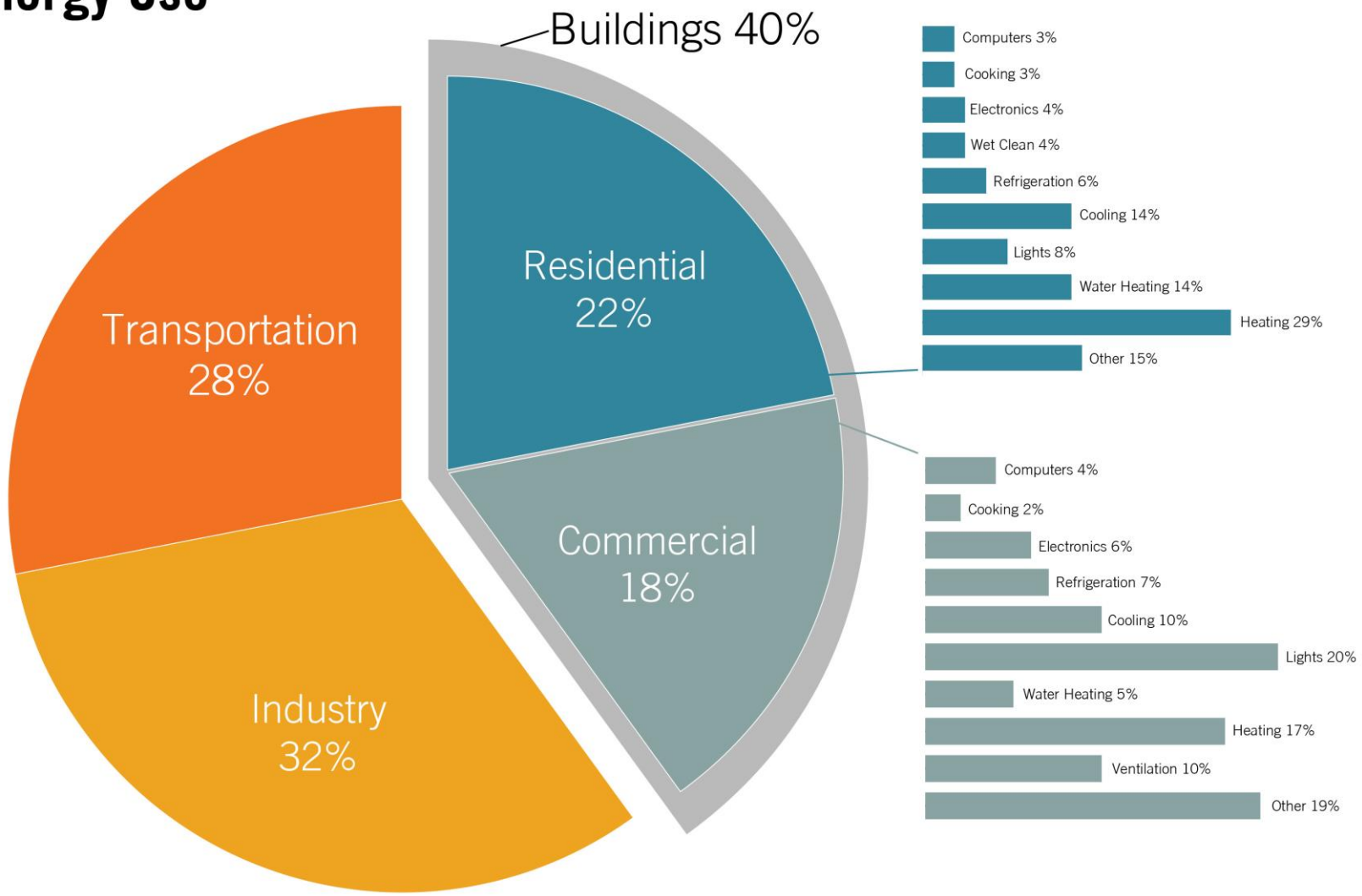
agree that saving energy helps the environment

https://www.xcelenergy.com/staticfiles/xe/Marketing/Managing-Energy-Costs-Schools.pdf



THERE IS A DEVASTATING RISK IF WE DO NOTHING

U.S. Energy Use



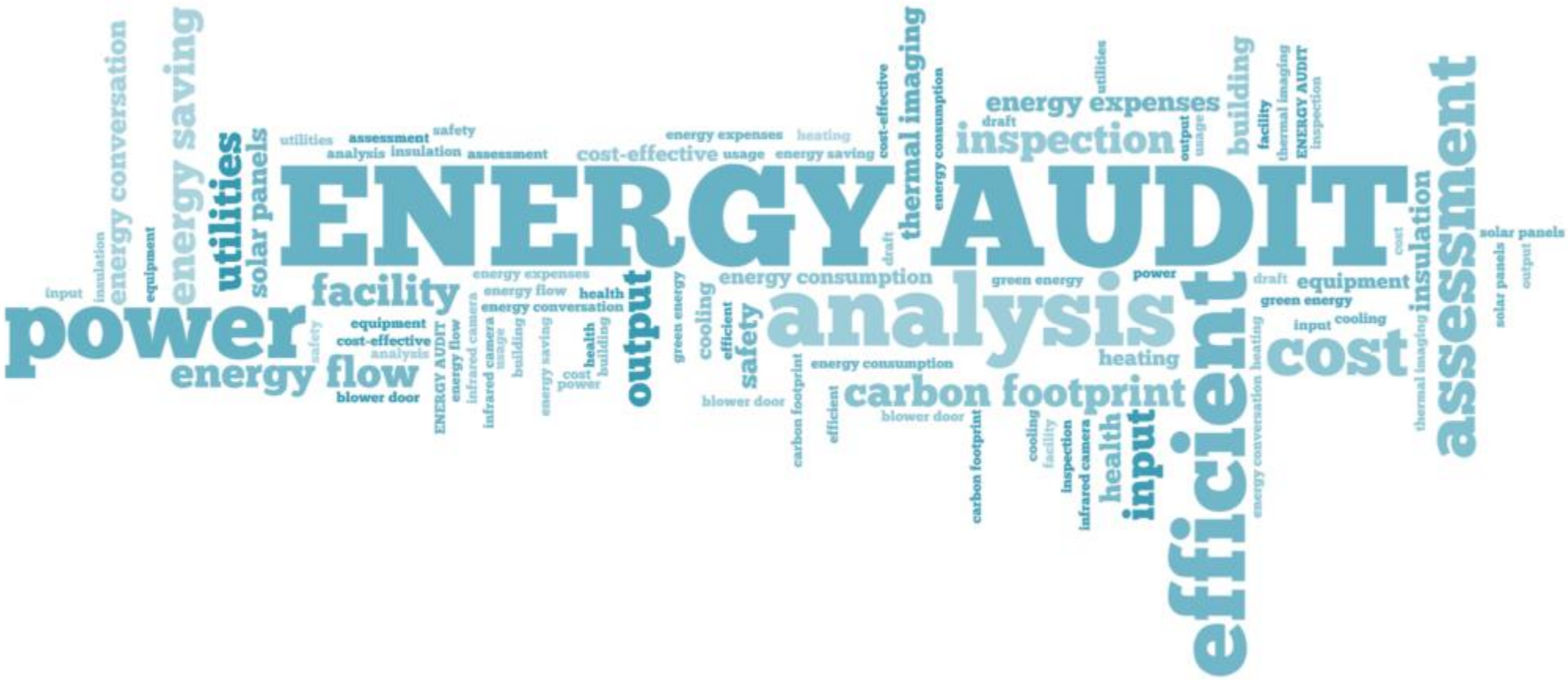
36% of CO_2 emissions

https://www.pae-engineers.com/news/articles/the-time-is-right-for-zero-energy-buildings

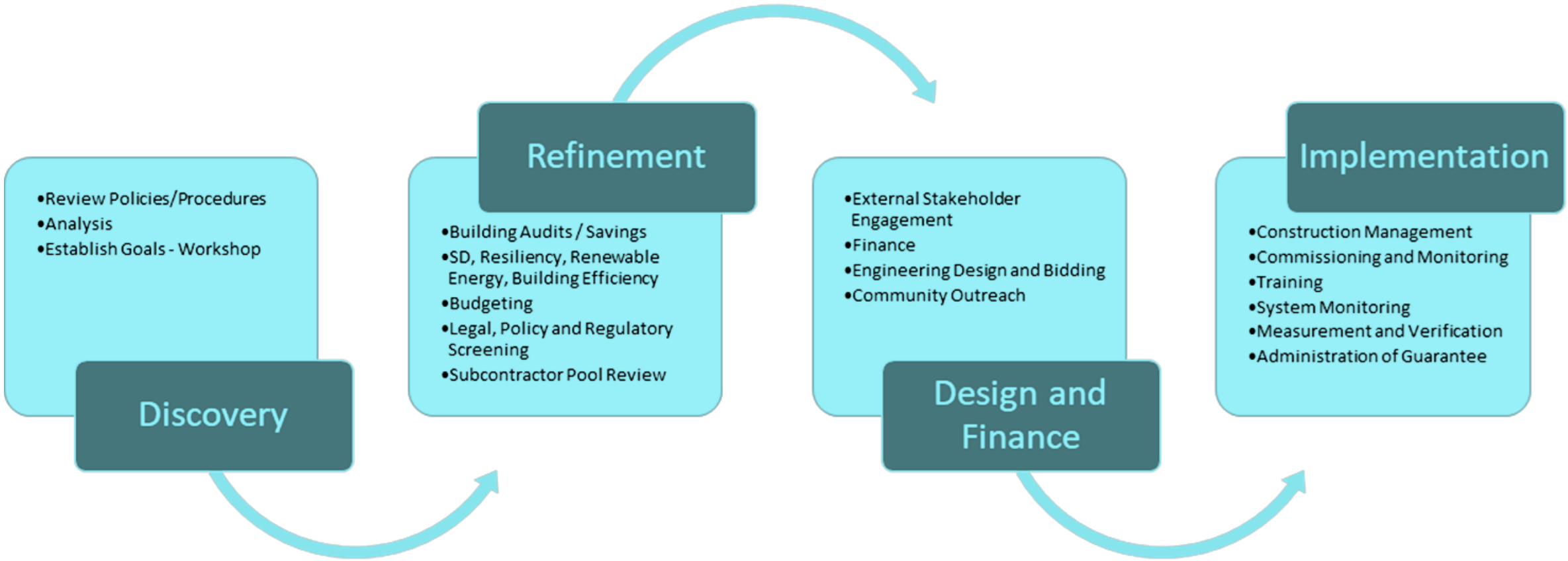
On average, high-performance schools can use between **65%–80% less energy** than conventionally constructed schools, and the remaining energy required is supplied by renewable energy.

https://betterbuildingsinitiative.energy.gov/accelerators/zero-energy-schools

WHAT IS THE CURRENT EUI OF YOUR BUILDINGS?



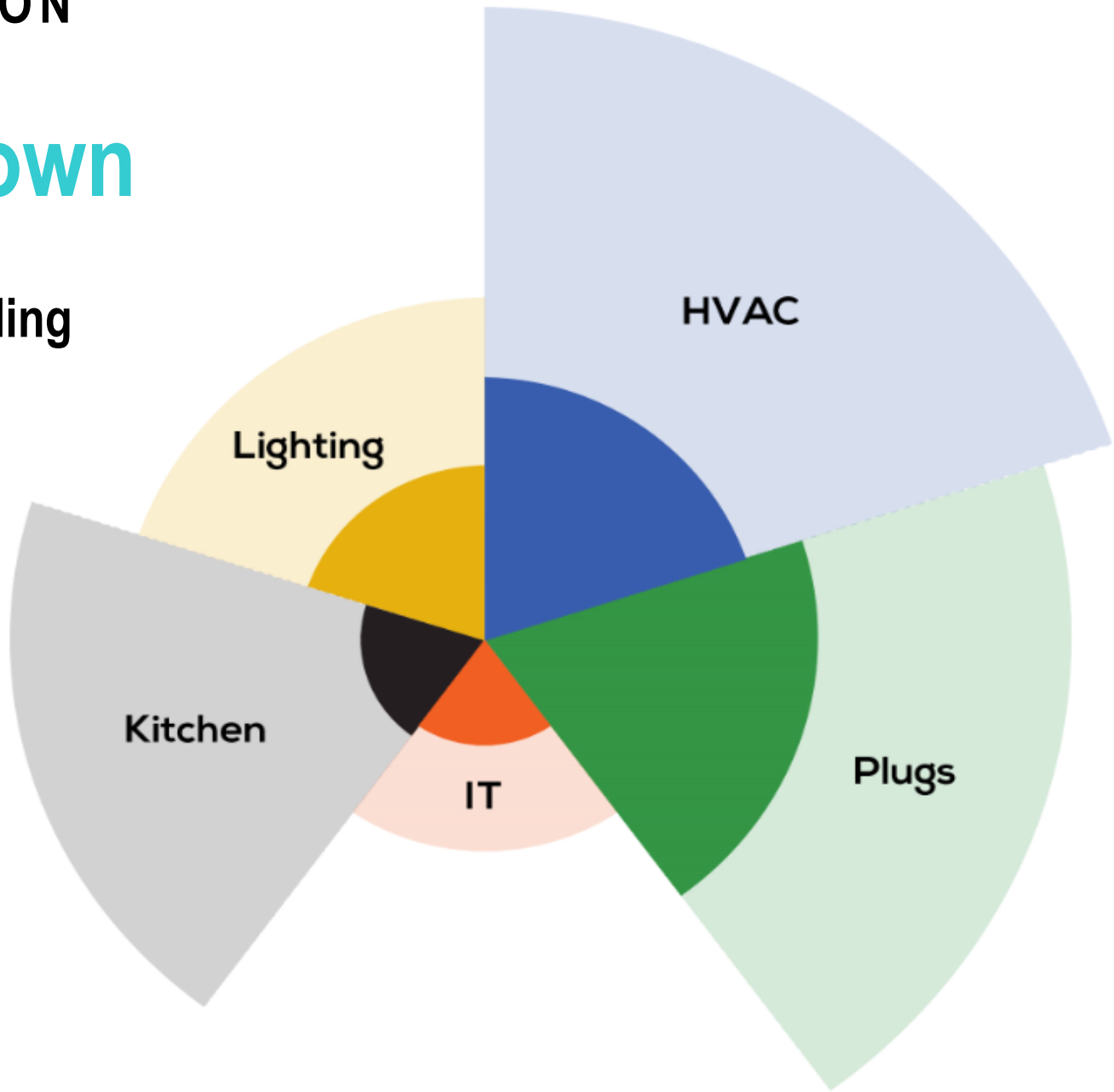
ENERGY AUDITS - PROCESS

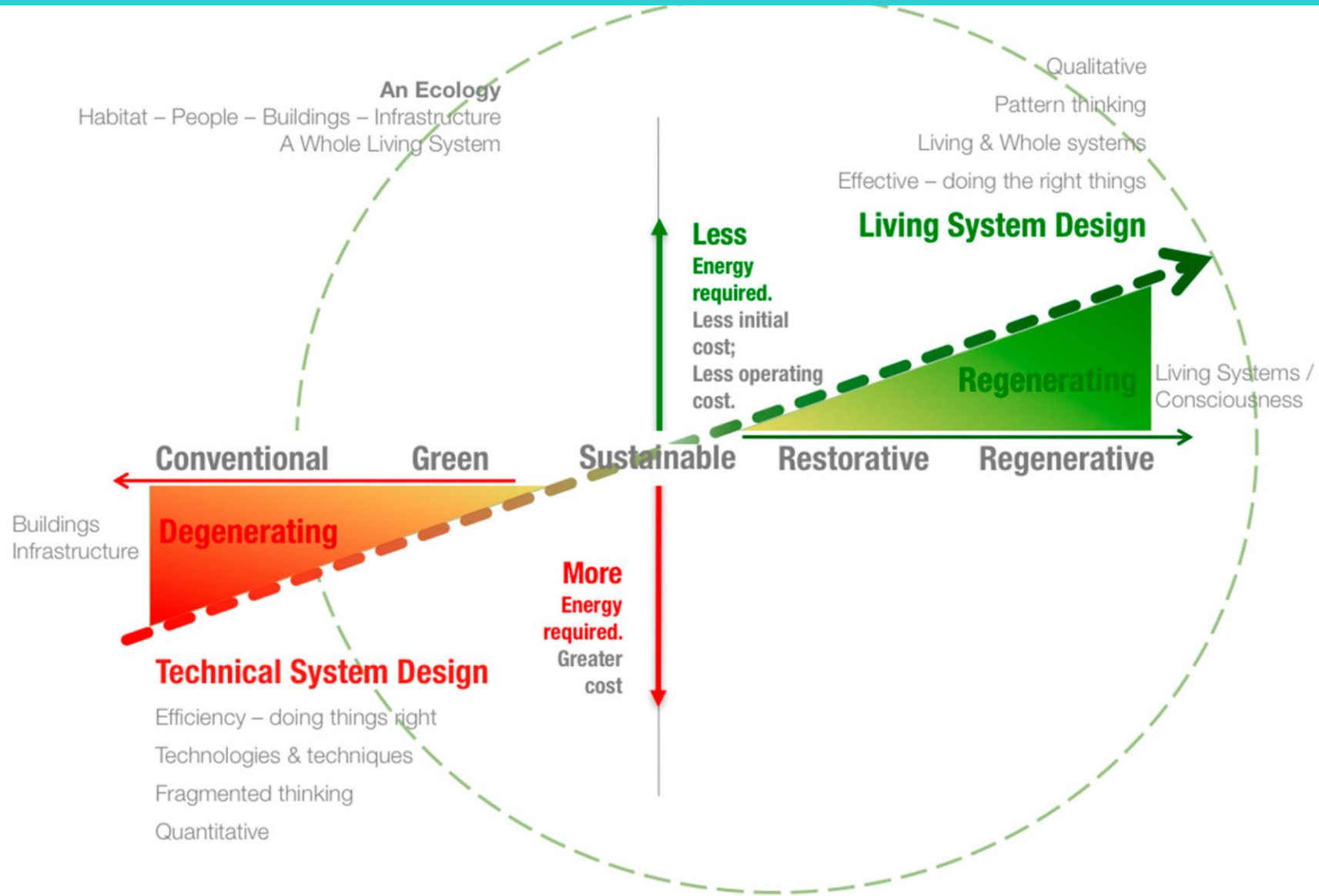


ENERGY & CARBON

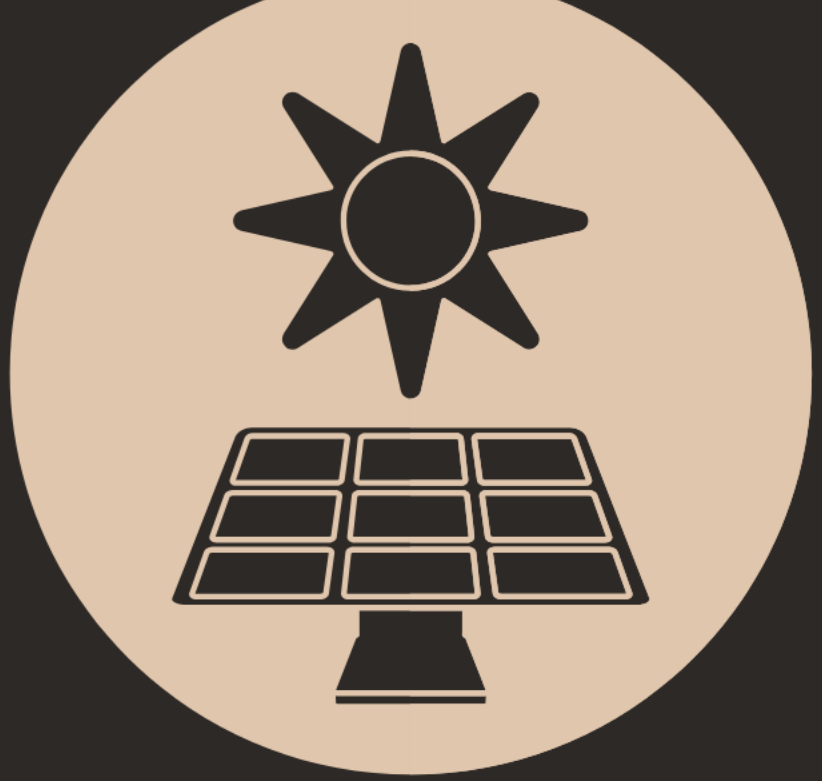
EUI Breakdown

Typical Building vs.
Net Zero Energy Building



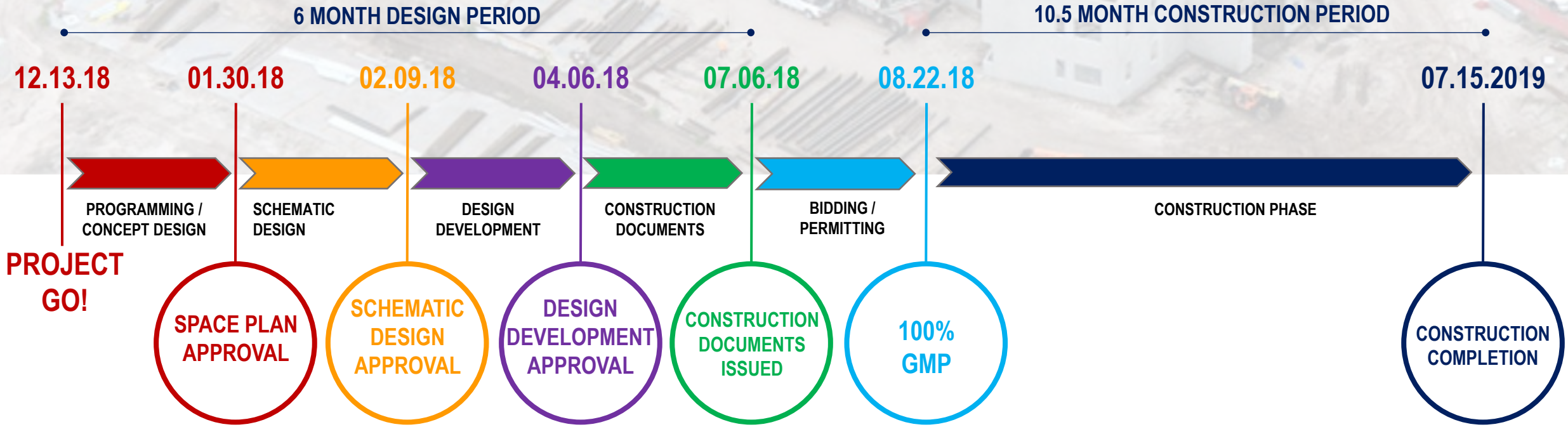


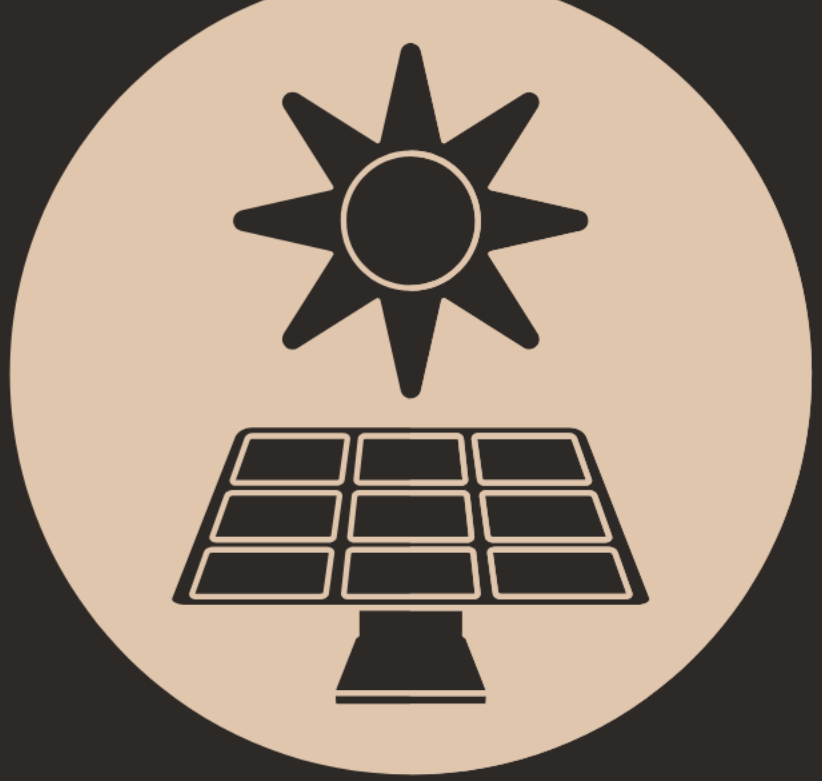
Trajectory of Ecological Design



IT DOESN'T TAKE LONGER TO BUILD A NET ZERO SCHOOL

SCHEDULE WAS THE CRITICAL PATH



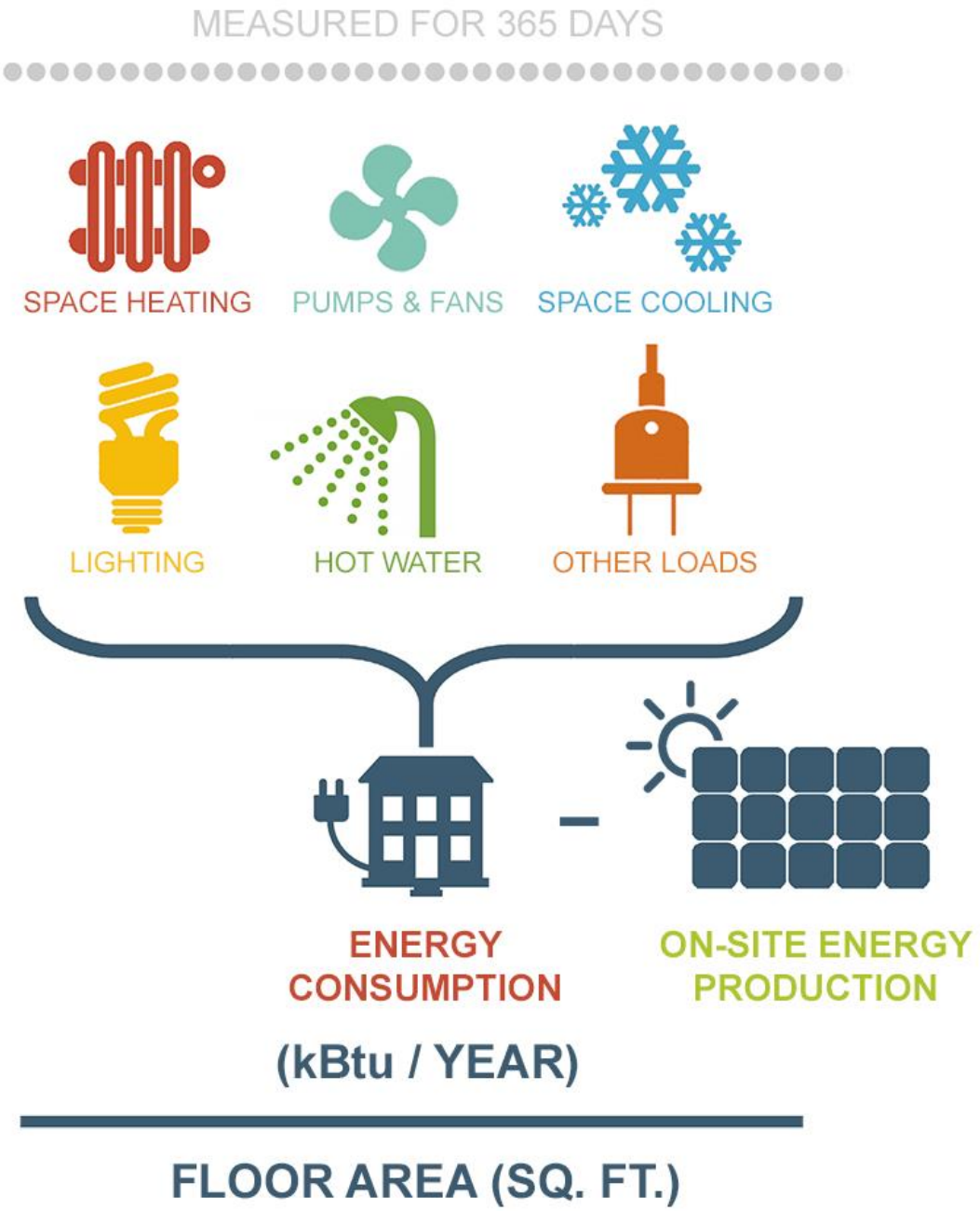


EUI: THE LOWER, THE BETTER

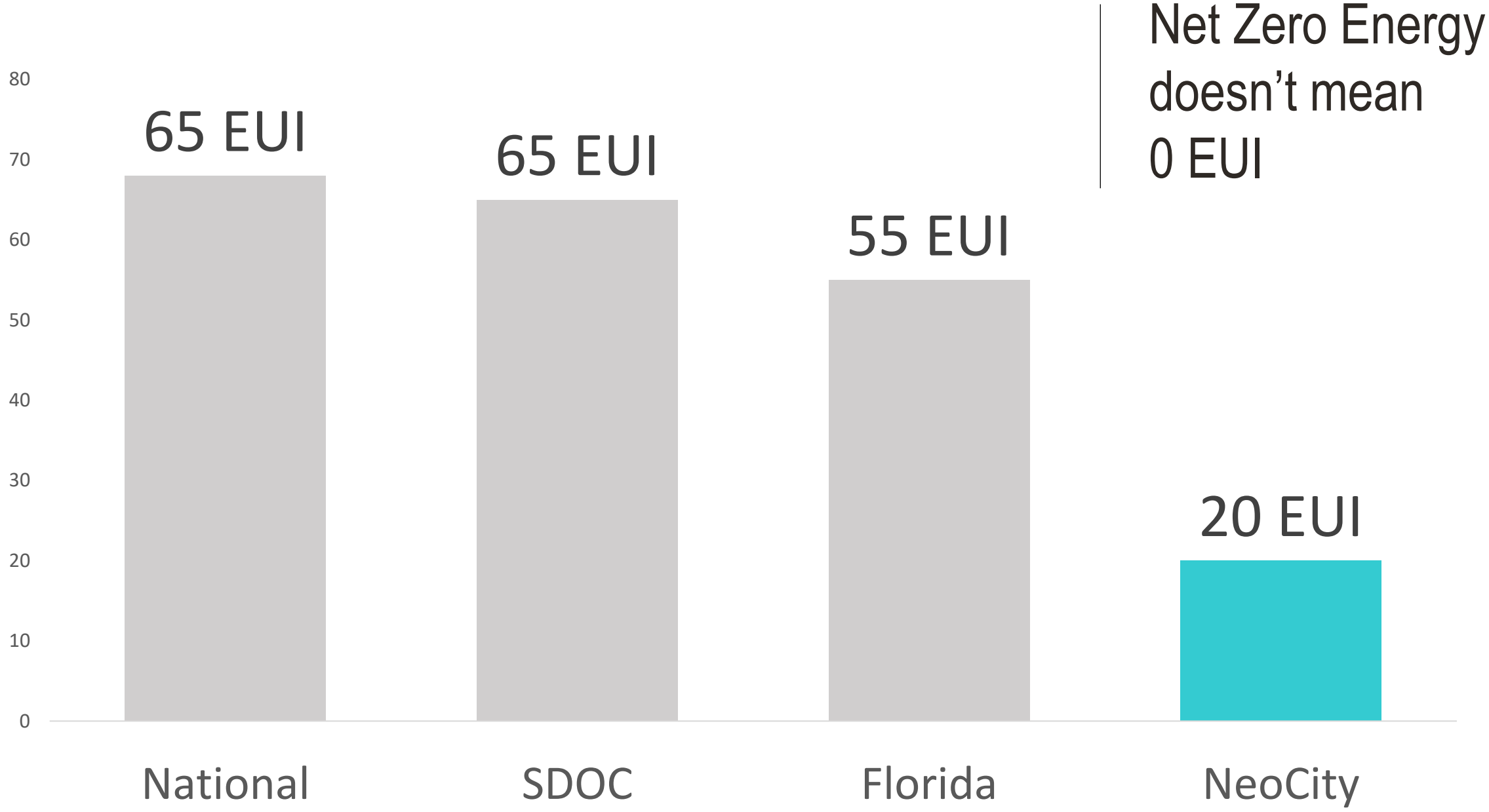
WHAT IS EUI?

Energy Use Intensity (EUI)
…the lower the number
…the lower the energy use

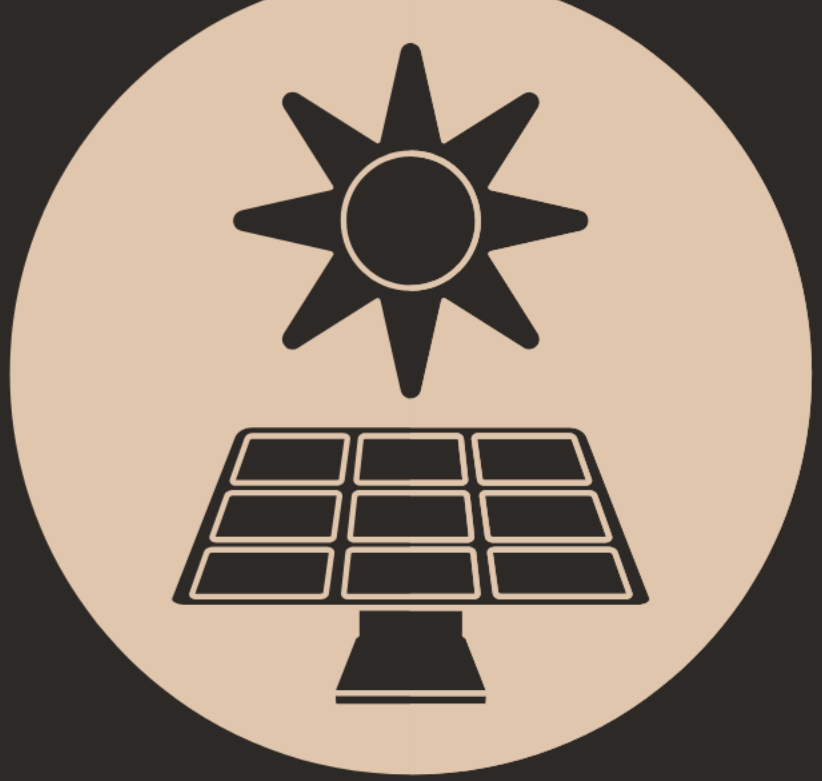
A net-zero energy building returns as much energy to the power grid as it uses in a year



WHAT IS EUI?

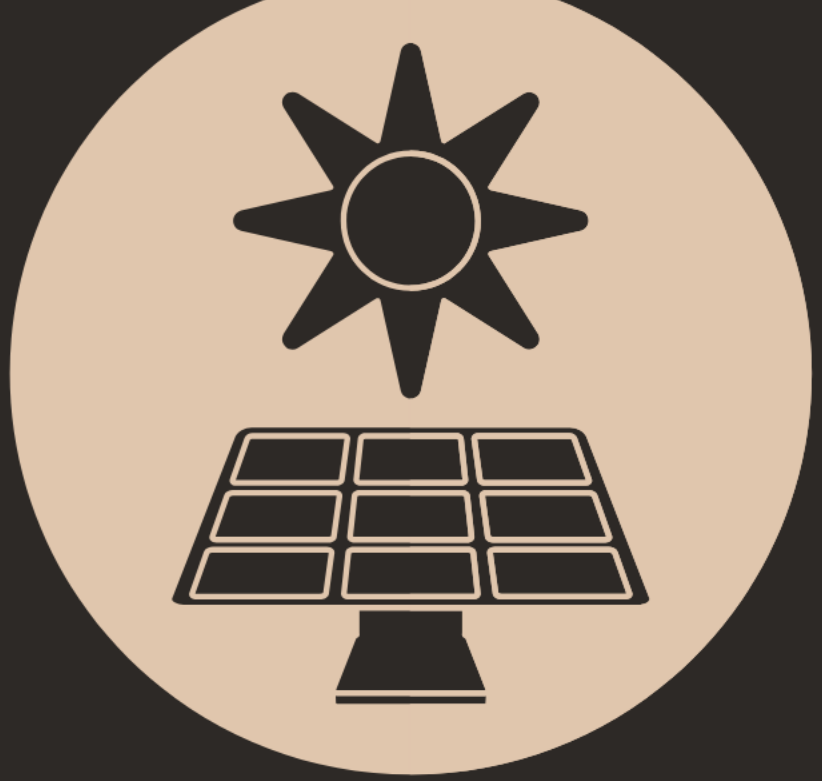


Net Zero Energy doesn't mean 0 EUI

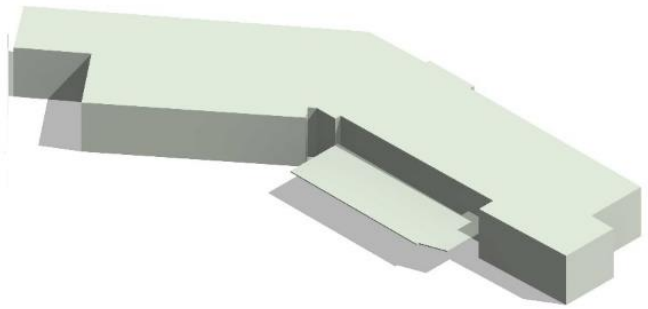


IT'S NOT JUST ABOUT SOLAR PANELS

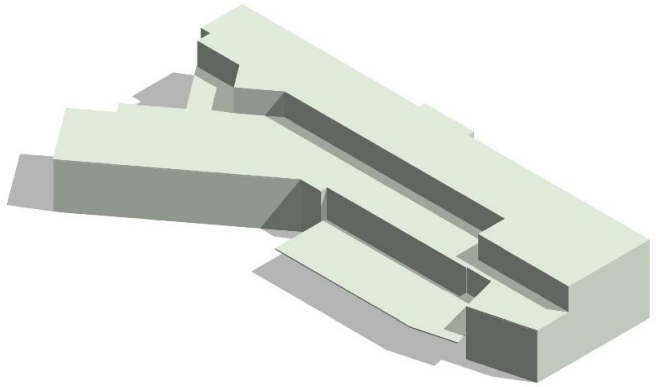

Any building can be zero-energy…
If you have a solar array big enough



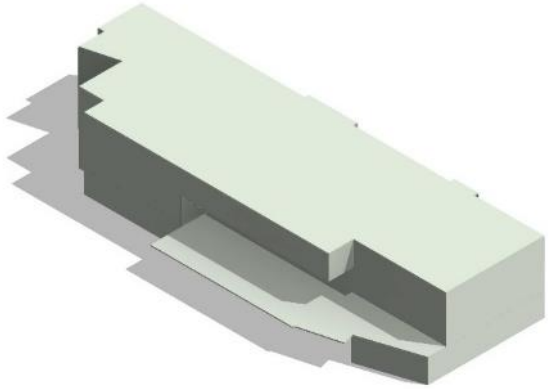
DATA MUST GUIDE YOUR DECISIONS



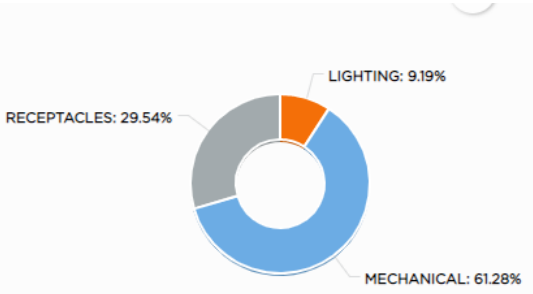
STUDY 01



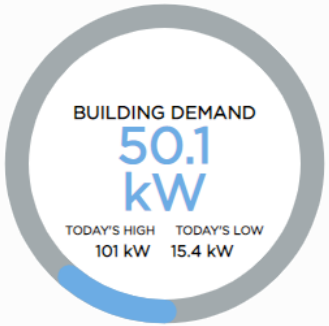
STUDY 02



STUDY 03



TOTAL CONSUMPTION: 268276.49 kWh



WHAT DOES THIS DATA MEAN?

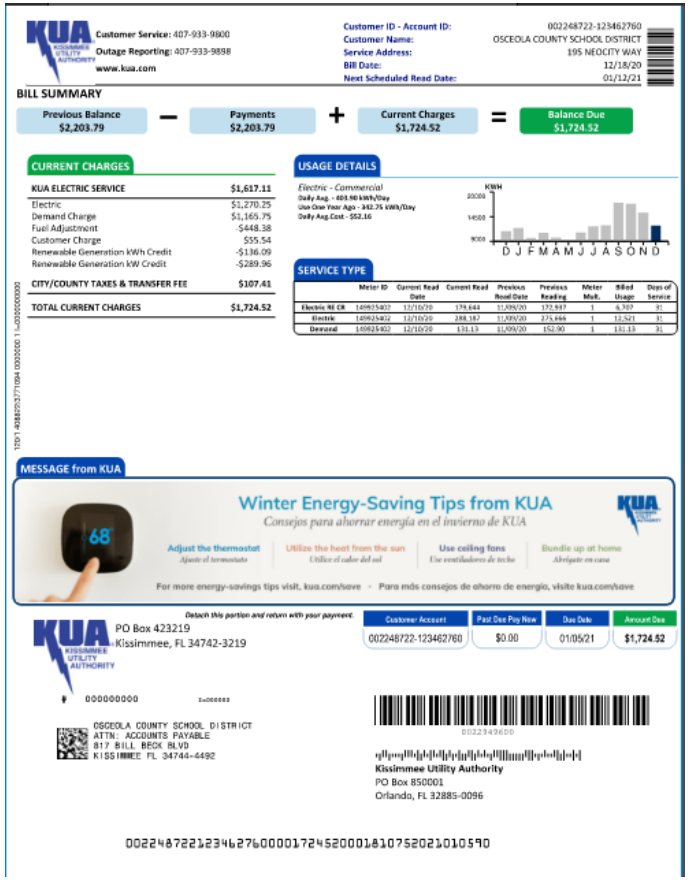
This data shows the total amount of energy used to operate Neocity. This includes all energy required to heat, cool and light the building, store and prepare food, operate technology, and power everything plugged into outlets.

PERCENT CHANGE

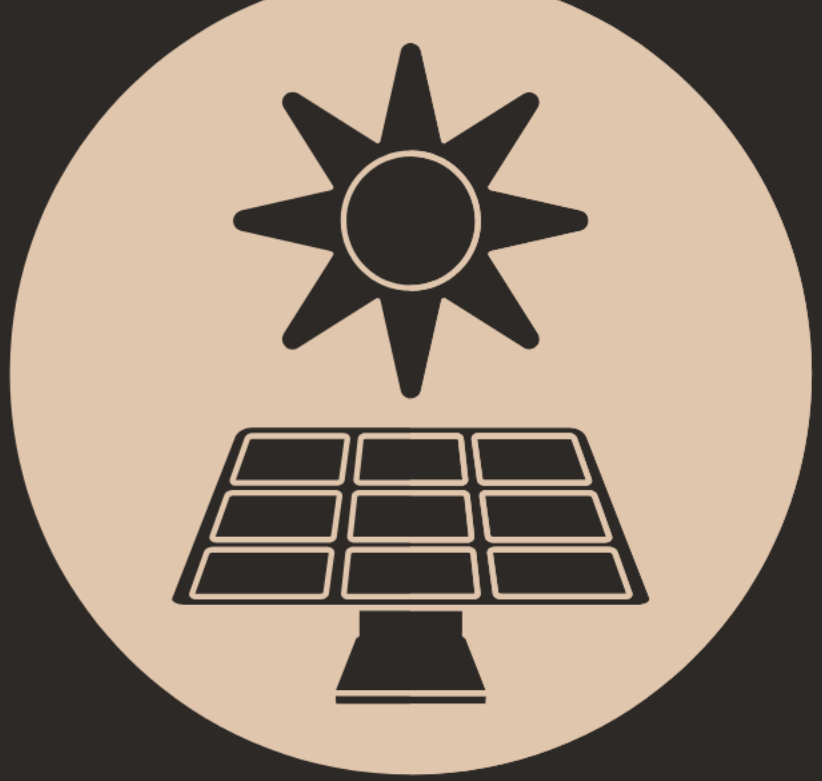
(FROM PREVIOUS PERIOD)

-24.9 %

HOME | 360° VIEW



#DATAISGOLD



IT'S COMPLEX, IT'S NOT COMPLICATED

"The most dangerous phrase in the English language is: ***"we've always done it this way"…***"

Rear Admiral Grace Hopper

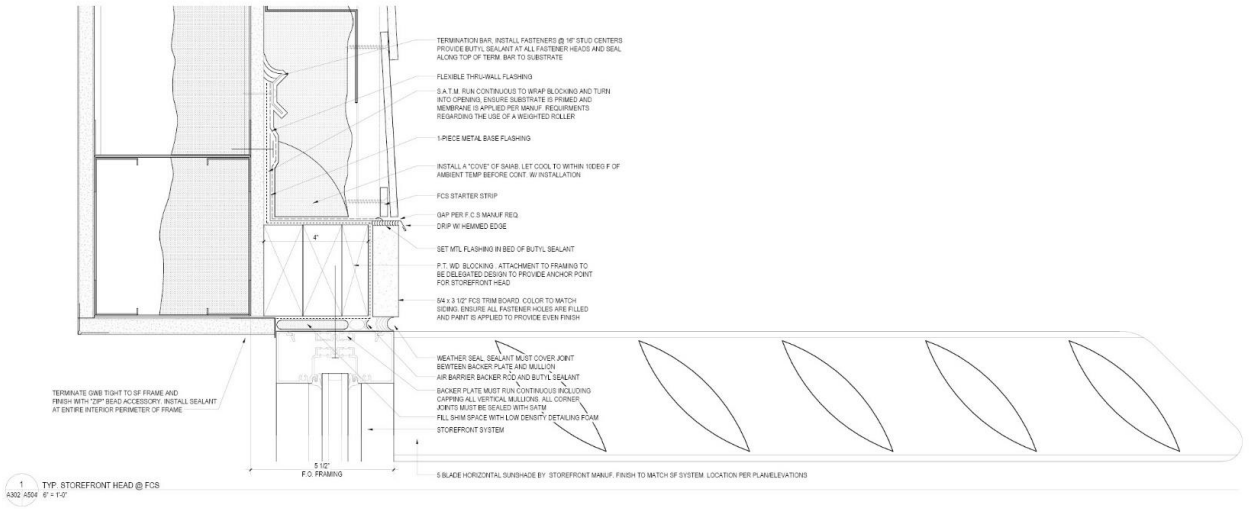
DISTRIBUTED HEAT PUMPS WITH A DEDICATED OUTDOOR AIR SYSTEM

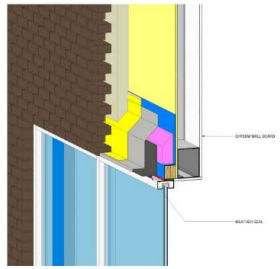
A major portion of a building's energy loss is by air leakage through the building's skin

MINIMIZE AIR LEAKAGE >>

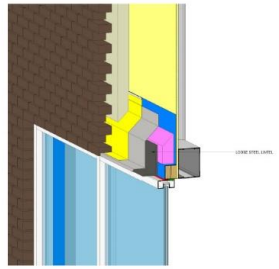
RIGHT SIZE MECH. SYSTEM >>

REDUCE ENERGY FOOTPRINT

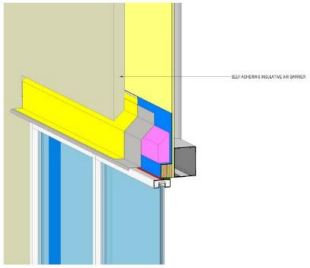




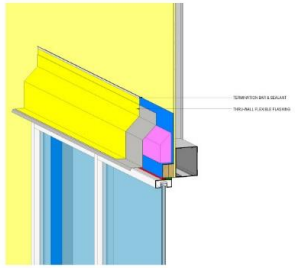
SEQUENCE 12 - WEATHER SEAL



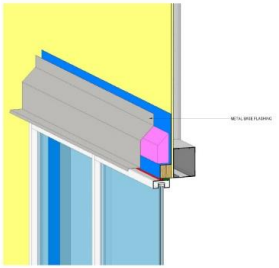
SEQUENCE 11 - LOOSE LINTEL & BRICK



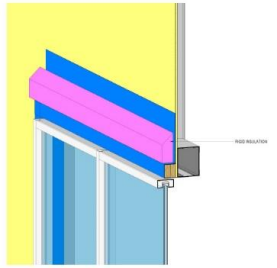
SEQUENCE 10 - S.A.I.A.B.



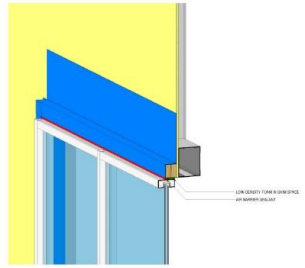
SEQUENCE 09 - FLEXIBLE THRU-WALL FLASHING AND TERM. BAR



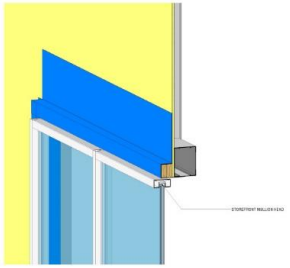
SEQUENCE 08 - METAL BASE FLASHING



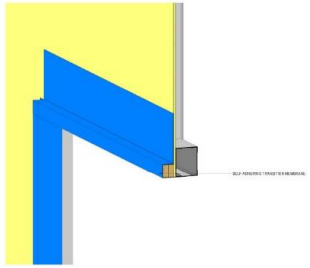
SEQUENCE 07 - RIGID INSULATION



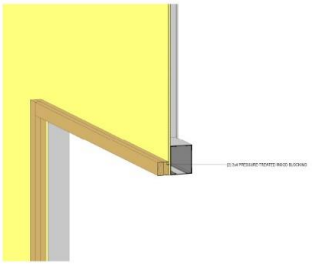
SEQUENCE 06 - AIR BARRIER SEALANT & FOAM



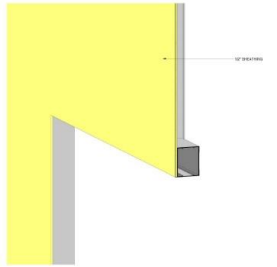
SEQUENCE 05 - STOREFRONT



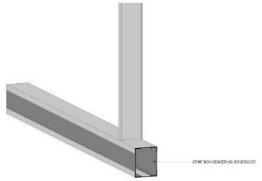
SEQUENCE 04 - S.A.T.M.



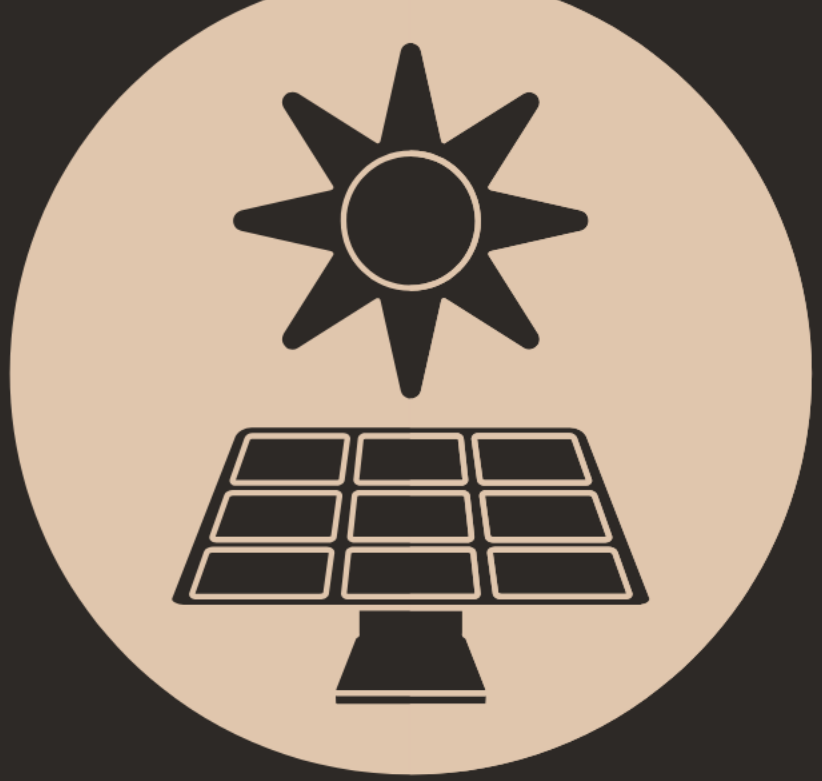
SEQUENCE 03 - WOOD BLOCKING



SEQUENCE 02 - SHEATHING

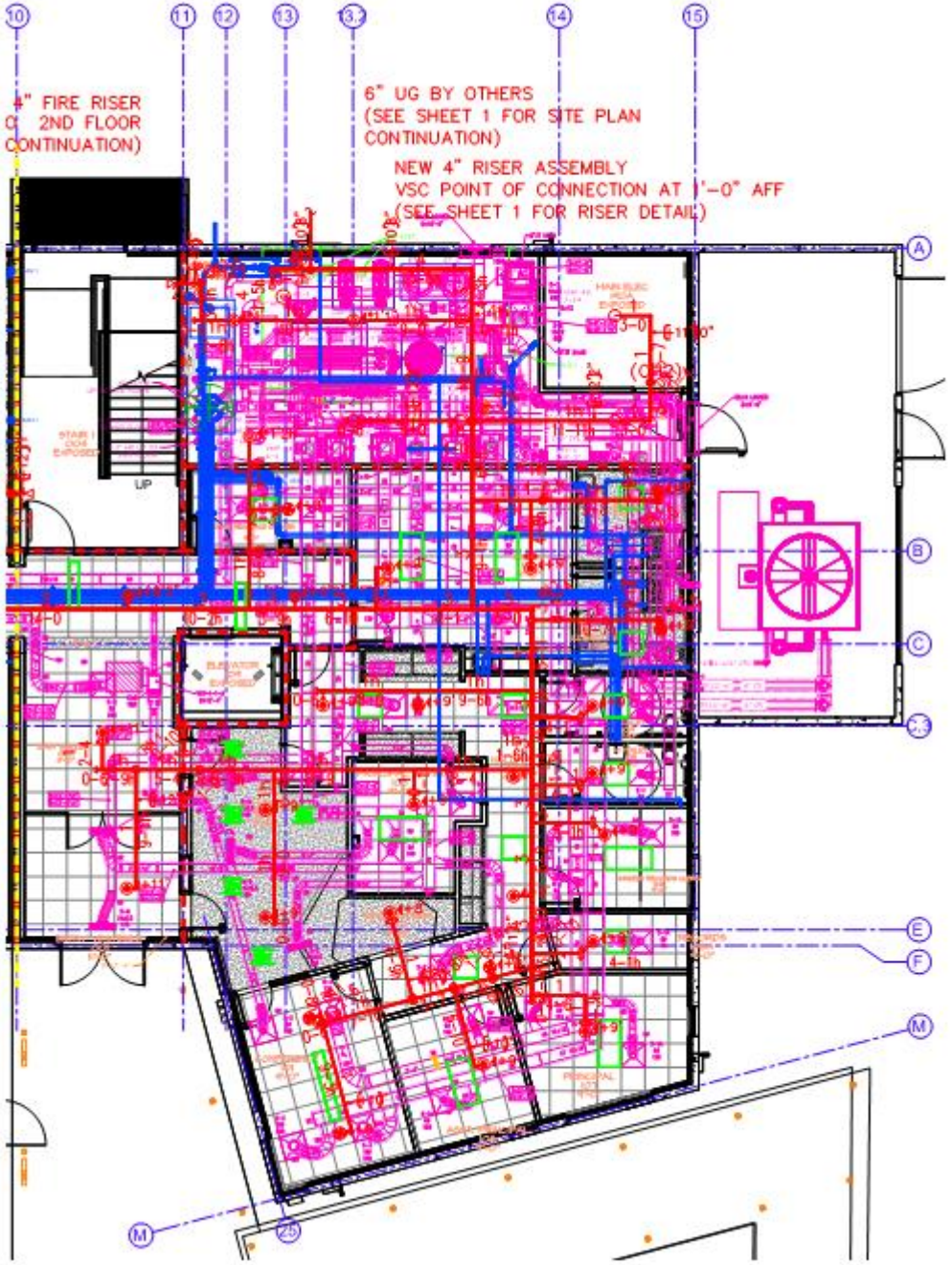


SEQUENCE 01 - CFMF

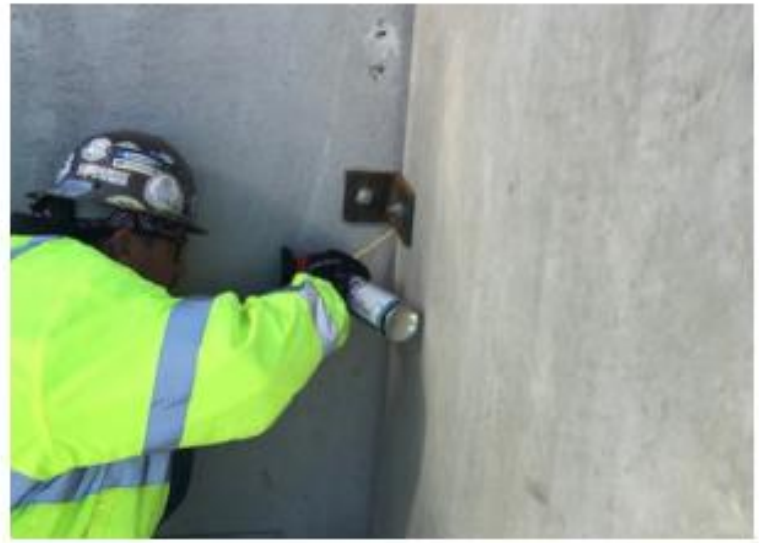


DESIGN IS ONLY 50% OF THE PROCESS

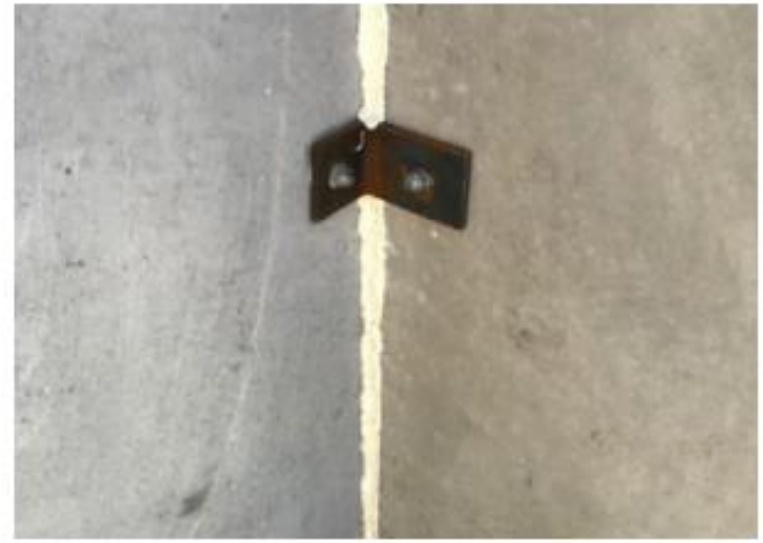
WILL IT HIT : WILL IT FIT



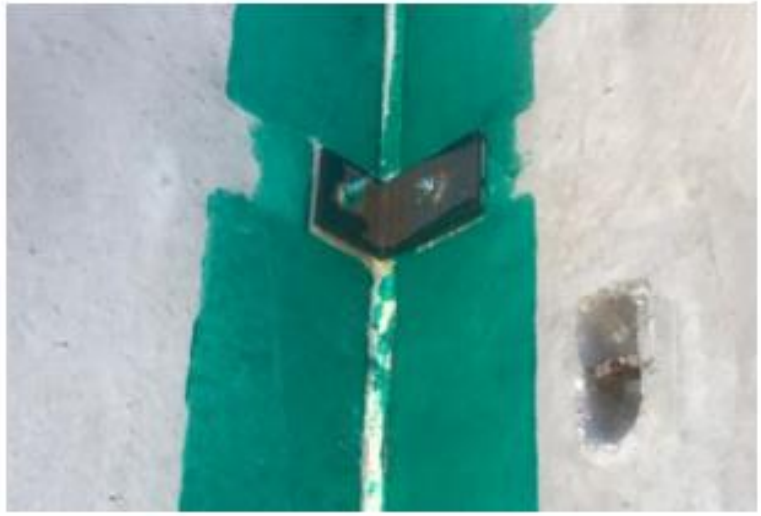
STEP 1: INSTALL BACKER ROD IN JOINT



STEP 2: INSTALL SPRAY FOAM INSULATION IN JOINT



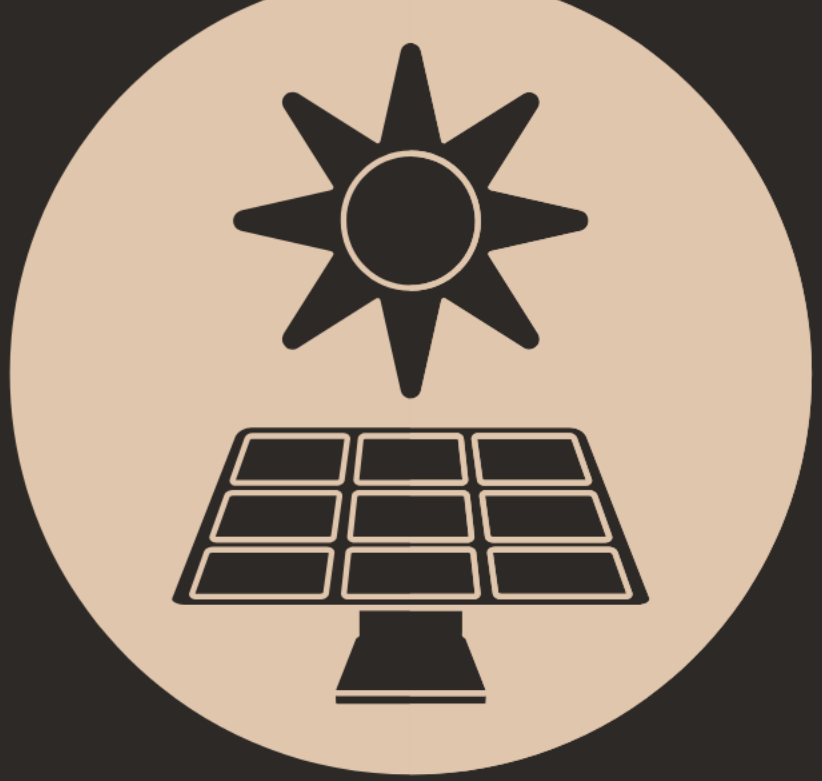
STEP 3: TRIM SPRAY FOAM FLUSH WITH WALL



STEP 4: APPLY TRANSITION PRIMER TO BOTH SIDES OF JOINT

STEP 5: APPLY TRANSITION MEMBRANE AND ADHERE WITH WEIGHTED ROLLER

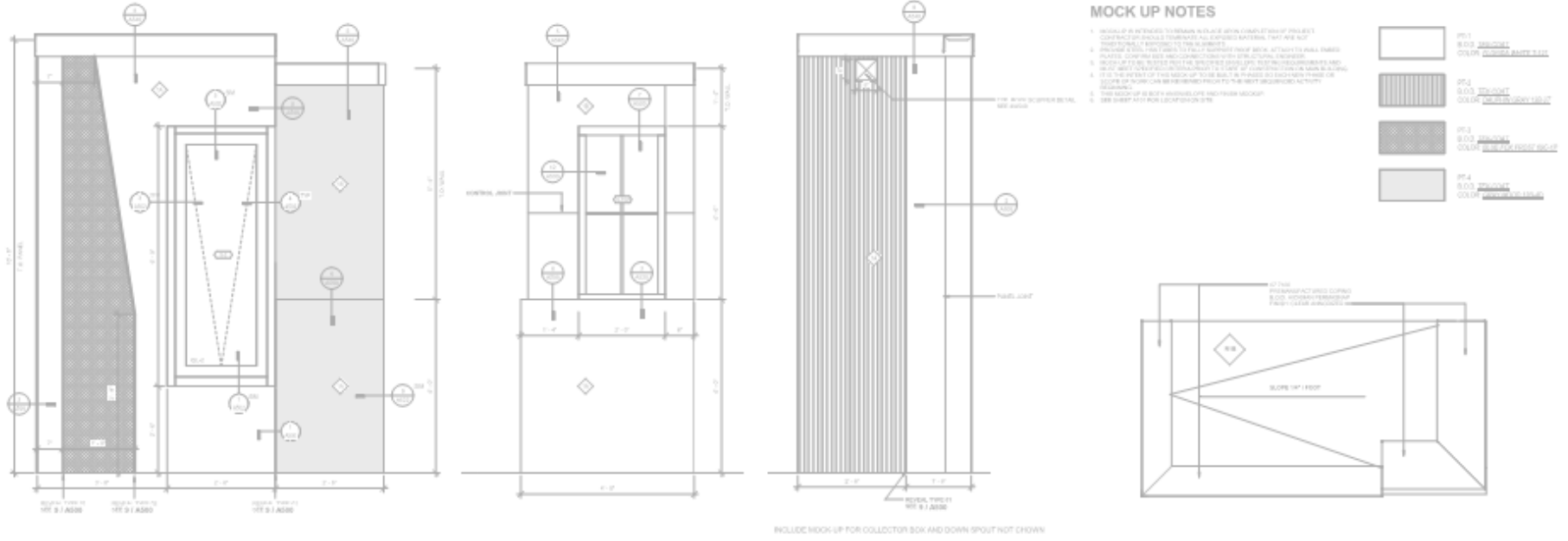
STEP 6: SEAL EDGES OF MEMBRANE WITH BUTYL SEALANT



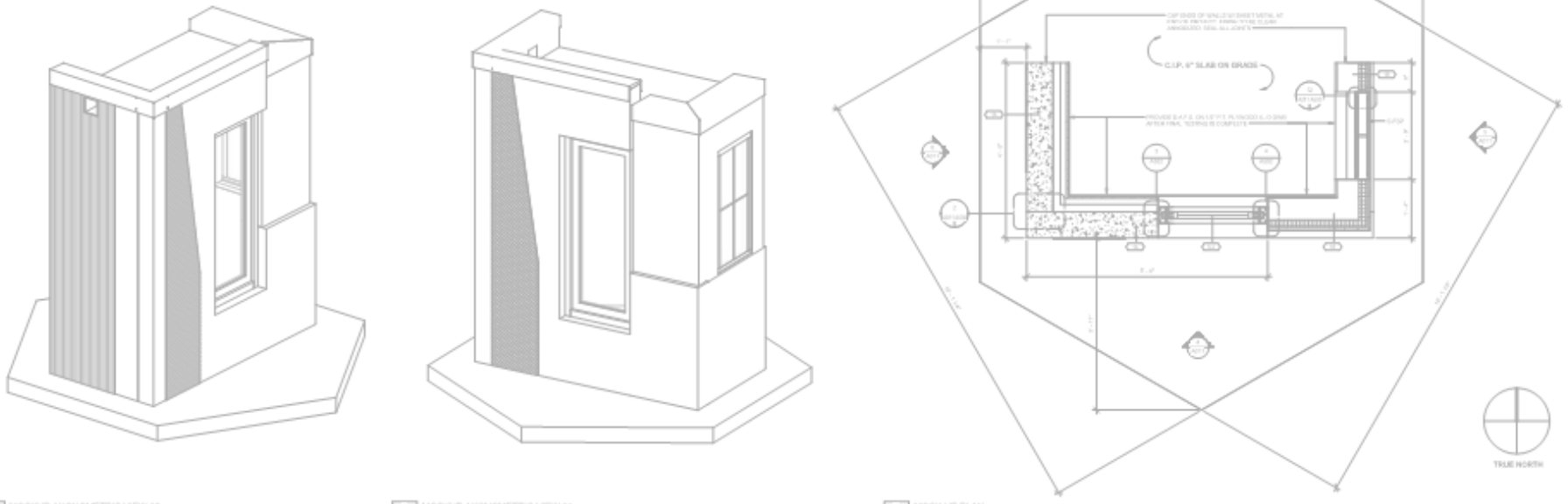
TRUST BUT VERIFY

QA/QC is everyone's job
but it starts at the sub contractor level

Summary of Envelope Assembly			
		TC	GC
Step #	Tilt Panel Joint Assembly	SIGN OFF	
	BEGINNING AT EXTERIOR SIDE OF THE JOINT		
1	Scrape Joint Clean.		
2	Install backer rod from the exterior 3" deep into the joint.		
3	Install the SikaFlex following the backer rod 3/4" depth in the joint.		
4	Install the LDF with a 2" depth in the joint.		
5	Install another back rod on the exterior.		
6	Install the Sikaflex.		
	ON THE INTERIOR SIDE OF THE JOINT		
7	Install LDF along the backer rod.		
8	Let LDF cure and expand.		
9	Trim the LDF flush with the face of the tilt panel.		
10	Prime tilt panel and LDF at the joint.		
11	Apply Blueskin at the joint covering LDF and primer.		
12	Roll and compress Blueskin with weighted roller		
13	Seal edges of the tape on the tilt panel with Butyl Sealant.		



MOCK-UPS ARE NON-NEGOTIABLE



3A MOCKUP AXONOMETRIC VIEW 02

2 MOCKUP AXONOMETRIC VIEW 01

1 MOCK-UP PLAN

TESTING

AND MORE TESTING

Envelope Testing ASTM 1186 Air Pressurization

6 | 7/9/19 | Not attributed | No deadline | Not completed | No final discharge

ASTM 1186 Air Pressurization Test performed by TSI Energy Solutions- PASSED

The official building envelope area is 73,286 sf.

The maintained pressure for the test is 75 Pascals.

The allowable CFM at the .15 CFM/sf is 10,993 CFM.

On the positive test we only had 2,182 CFM leak rate, .03 CFM/SF which is 19.85% of the max.

On the negative test we only had 1,970 CFM leak rate, .027 CFM/ sf which is 17.92% of the max.

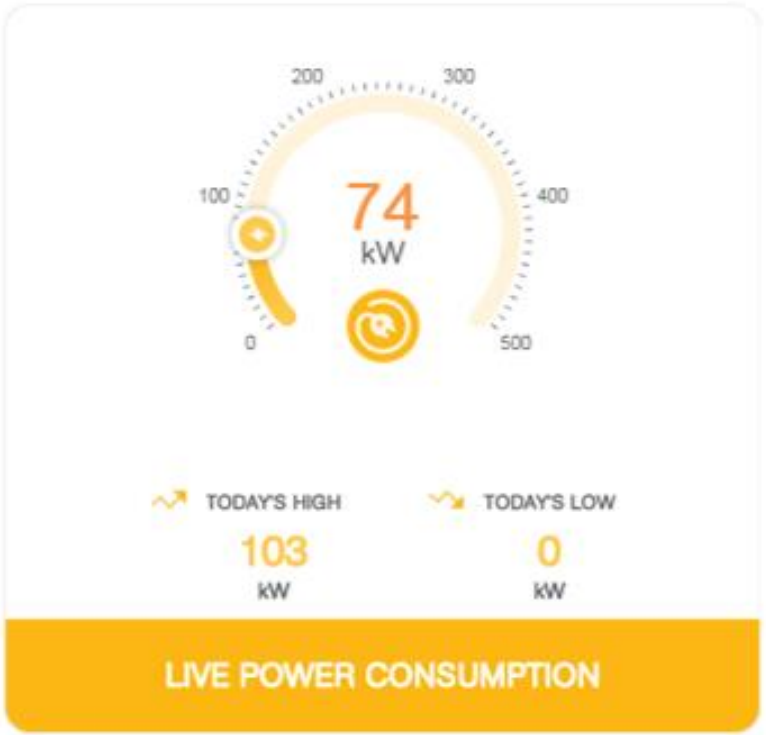
This facility is exceptionally tight.

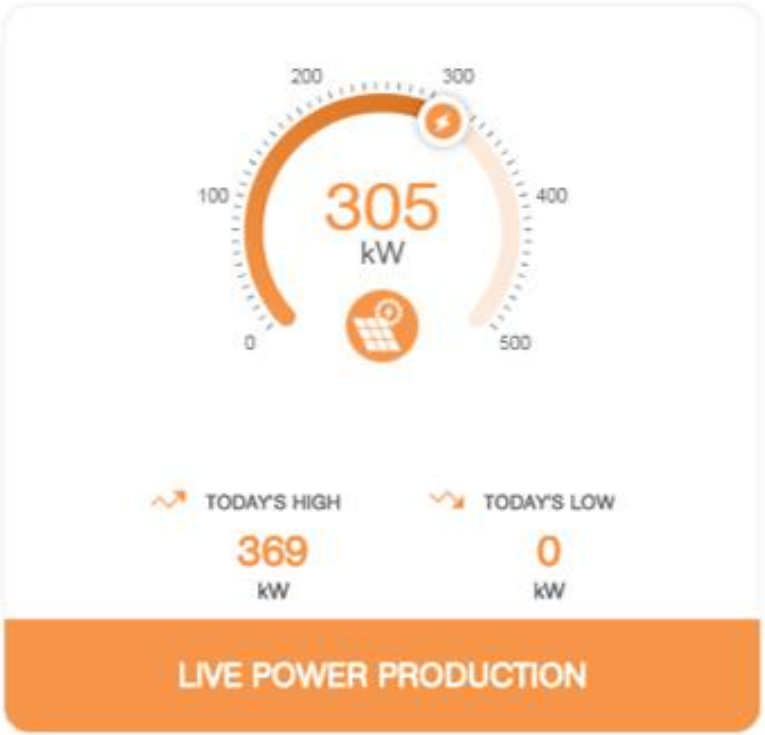
Final report by TSI Energy Solutions will be furnished and this report amended to include when received by ICE.

TESTED AIR INFILTRATION: .03 CFM
(81% BETTER THAN MAX ALLOWED)

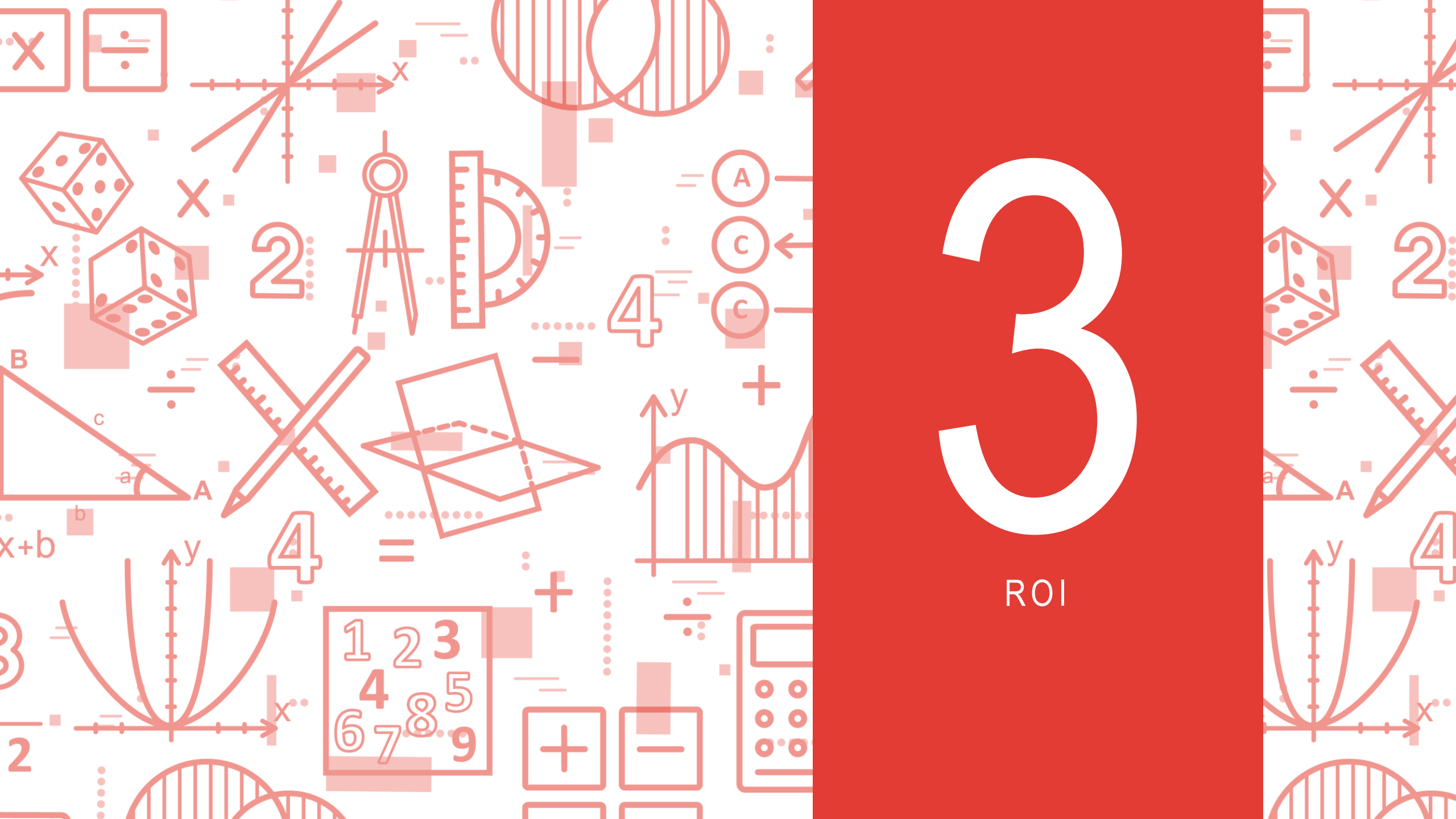





0
100
200
300
400
500
74
kW
TODAY'S HIGH
103
kW
TODAY'S LOW
0
kW
LIVE POWER CONSUMPTION


0
100
200
300
400
500
305
kW
TODAY'S HIGH
369
kW
TODAY'S LOW
0
kW
LIVE POWER PRODUCTION


0
100
200
300
400
500
231
kW
TODAY'S HIGH
306
kW
TODAY'S LOW
-82
kW
LIVE NET POWER



3

ROI

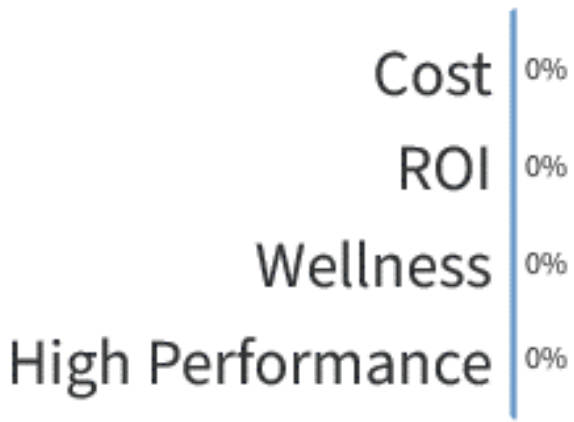
Log in to Poll Everywhere

To present live activities, please log in to your Poll Everywhere account in a separate window.

Launch log-in window

Respond at **PollEv.com/heatherm550**

How do you currently prioritize decisions between Cost, ROI, Wellness and High Performance? Rank the below options.

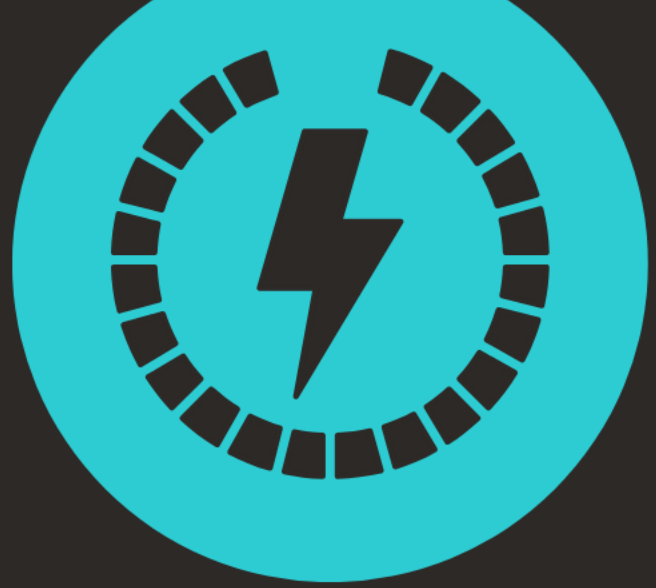


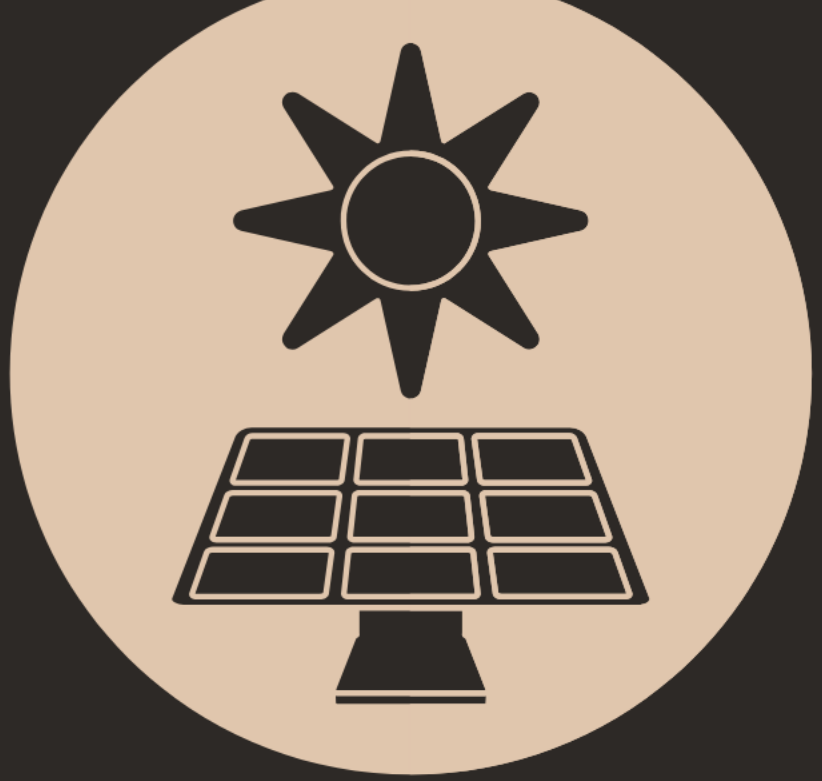
When poll is active, respond at **PollEv.com/heatherm550**

Do you think you could achieve them all (Wellness, High Performance, and ROI) within your budget?

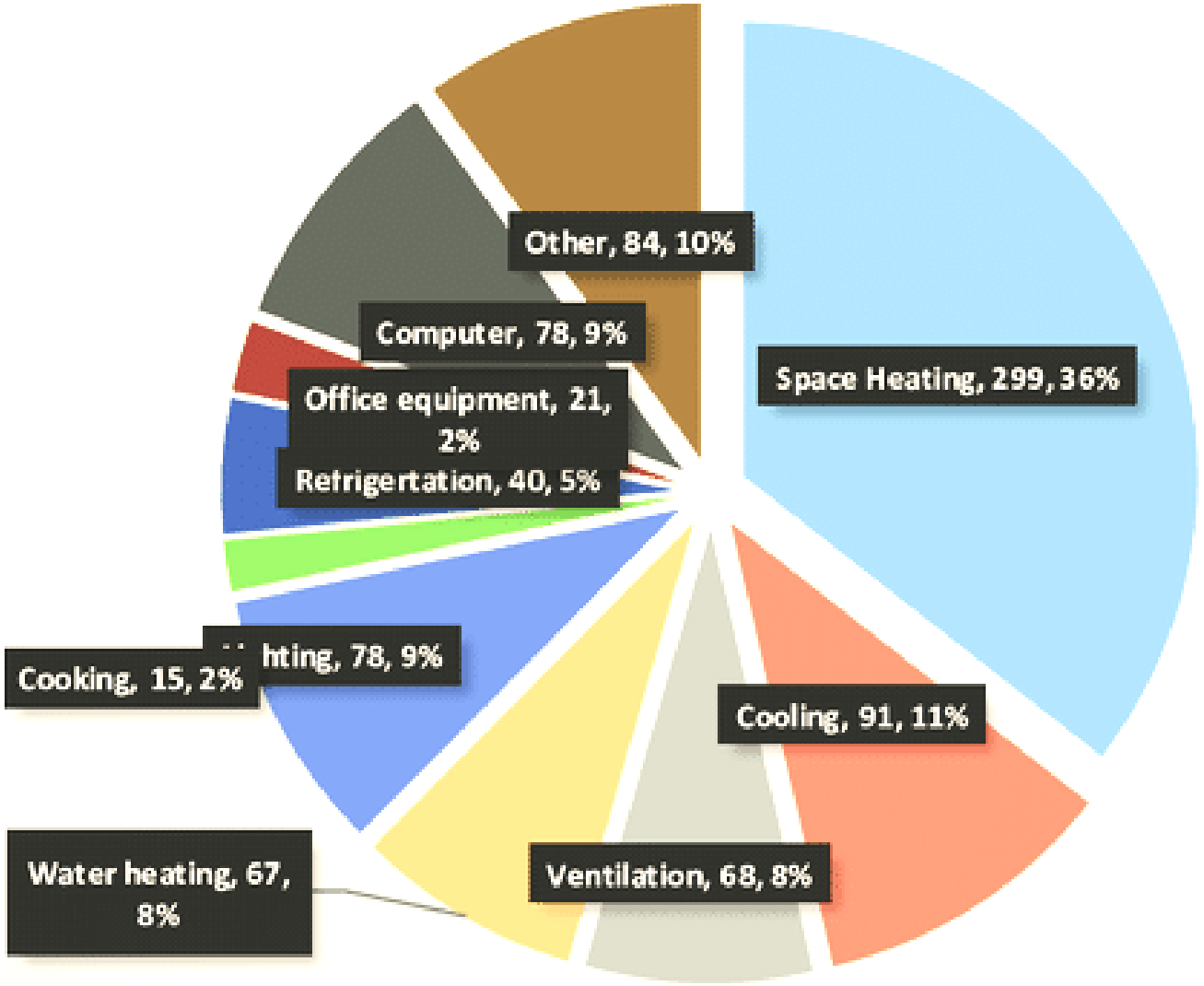
Yes

No





THE COSTS ARE NOT PROHIBITIVE



EDUCATIONAL BUILDINGS

“Each year, K–12 schools spend more than $8 billion on energy, — more than they spend on computers and textbooks combined.”

Source: Getting to Zero

In Florida, Renewable Energy must be...

Funded within the project budget

- OR -

Part of a Service Based Contract

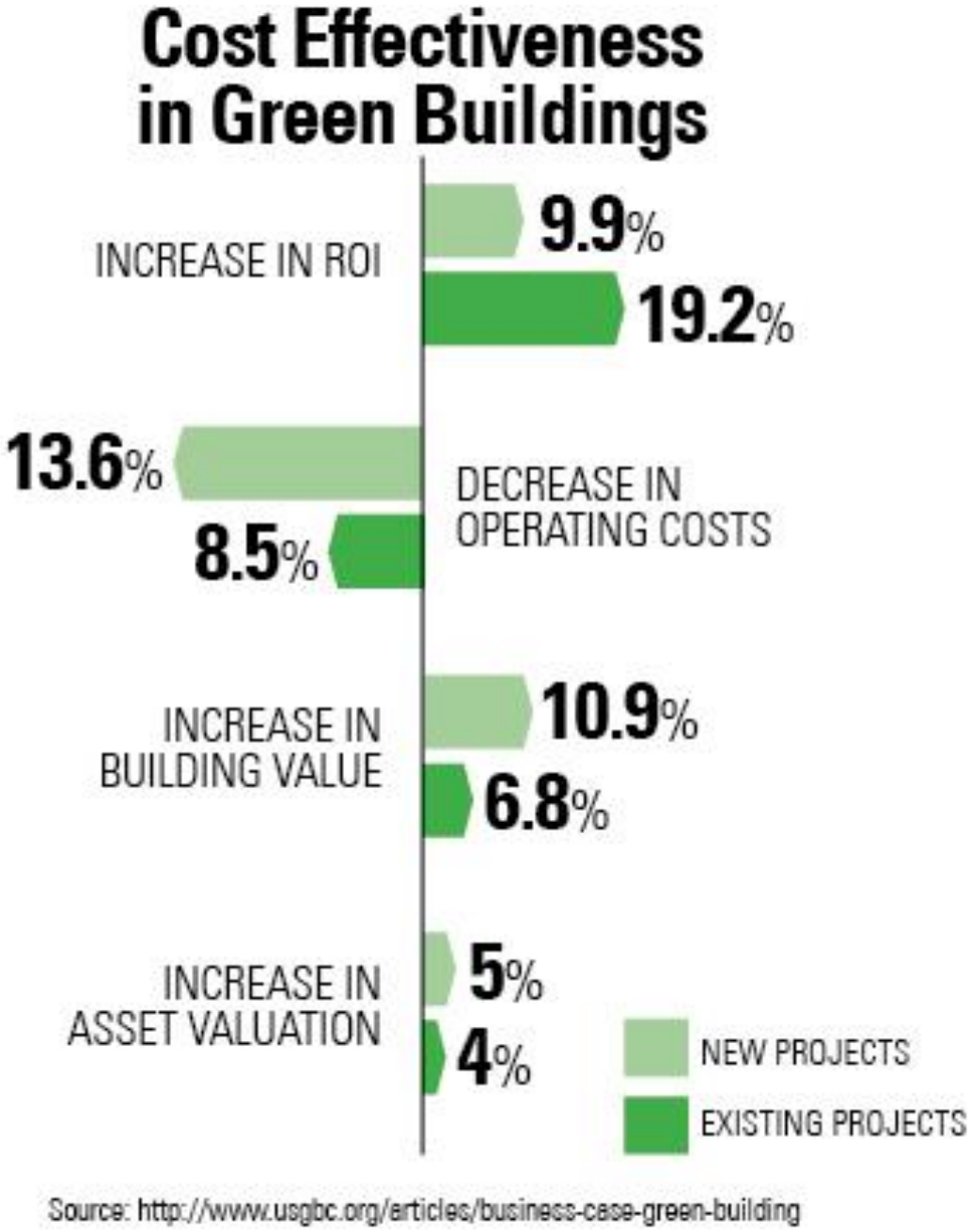
Not funded from outside sources

THE BUSINESS CASE FOR GREEN BUILDING

WORLD GREEN BUILDING COUNCIL

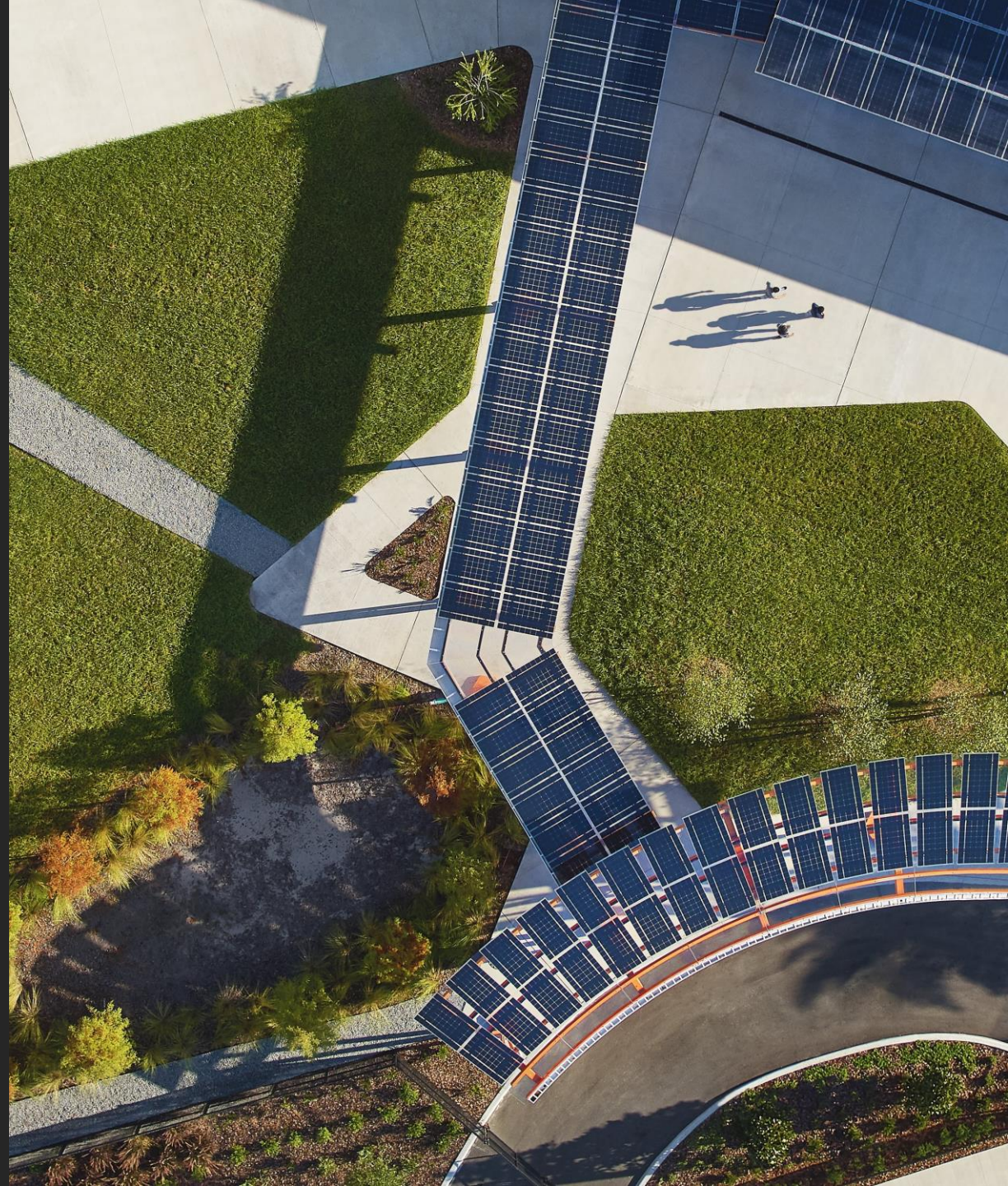
A Review of the Costs and Benefits for Developers, Investors and Occupants

https://www.worldgbc.org/sites/default/files/Business_Case_For_Green_Building_Report_WEB_2013-04-11-2.pdf



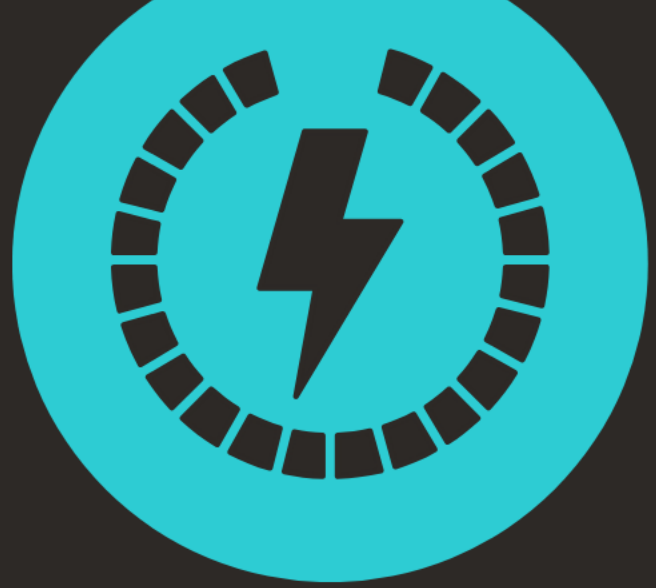
“Energy savings in green buildings typically exceed any design and construction cost premiums within a reasonable payback period.”

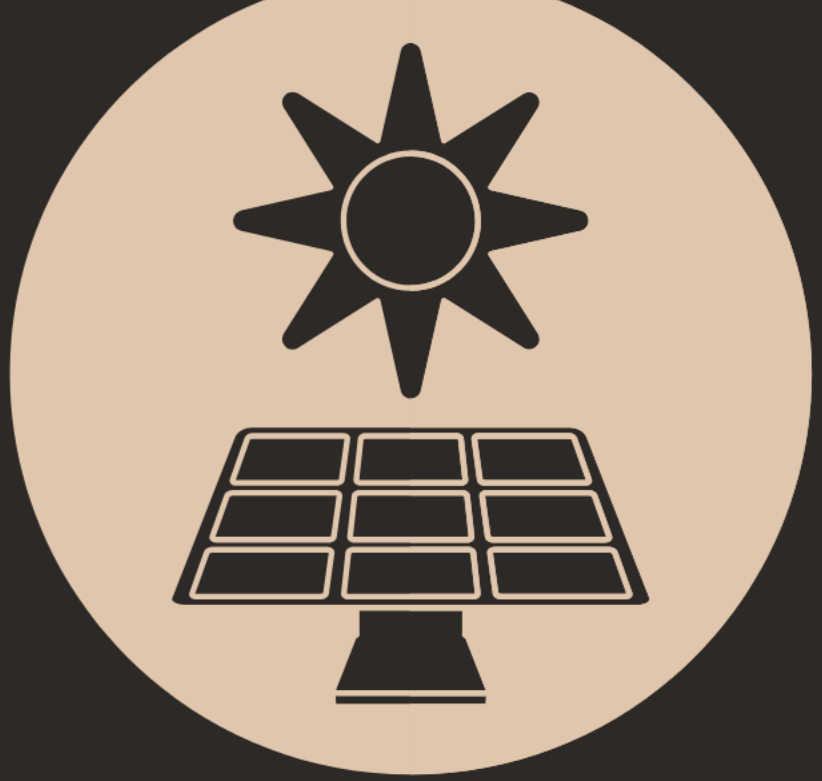
https://www.worldgbc.org/sites/default/files/Business_Case_For_Green_Building_Report_WEB_2013-04-11-2.pdf



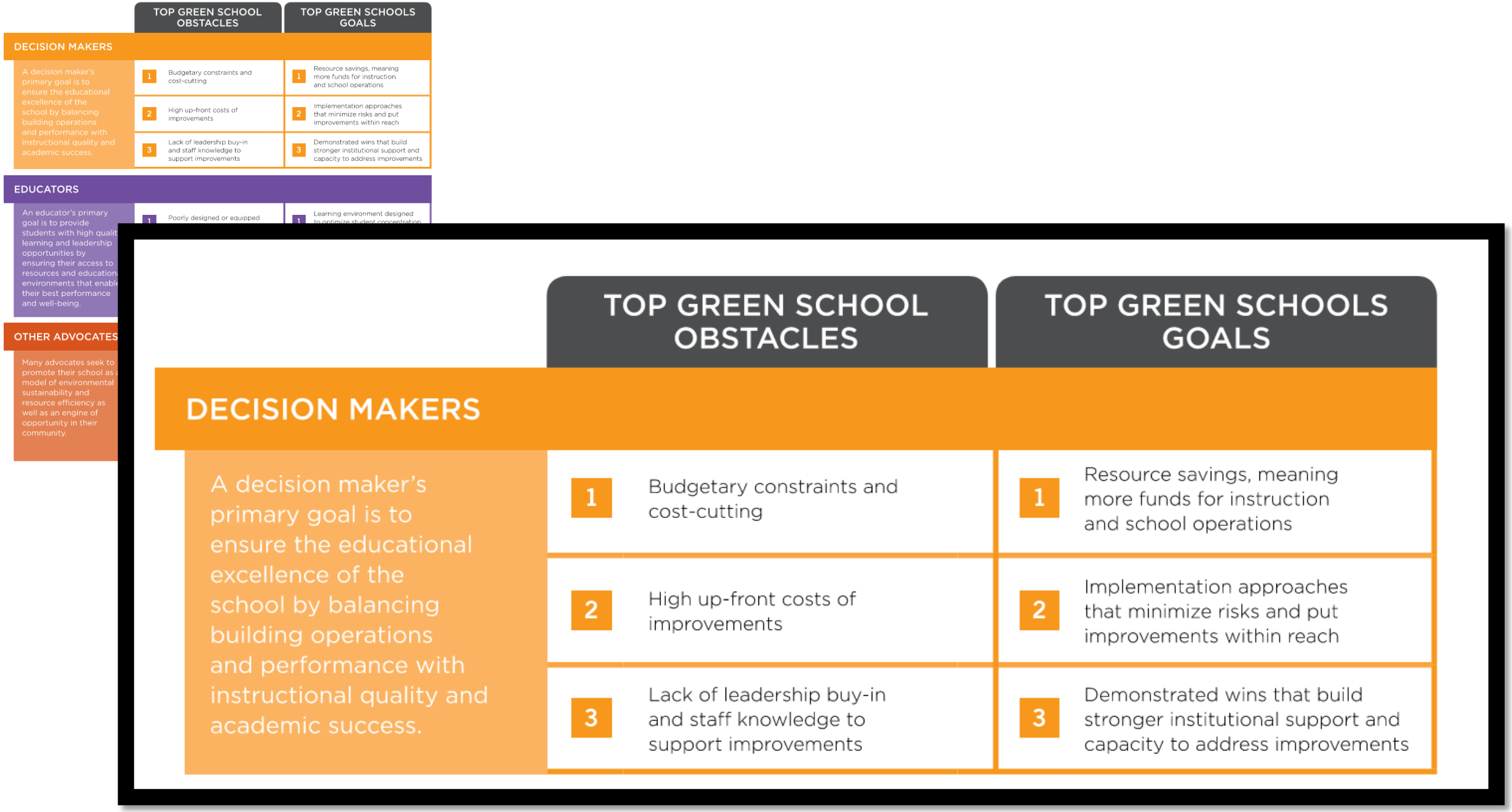
“In order to achieve their predicted performance, high-performing green buildings need to be backed up by robust commissioning, effective management, and collaboration between owners and occupiers..”

https://www.worldgbc.org/sites/default/files/Business_Case_For_Green_Building_Report_WEB_2013-04-11-2.pdf





THE KEY TO SUCCESS IS AN INTERNAL CHAMPION

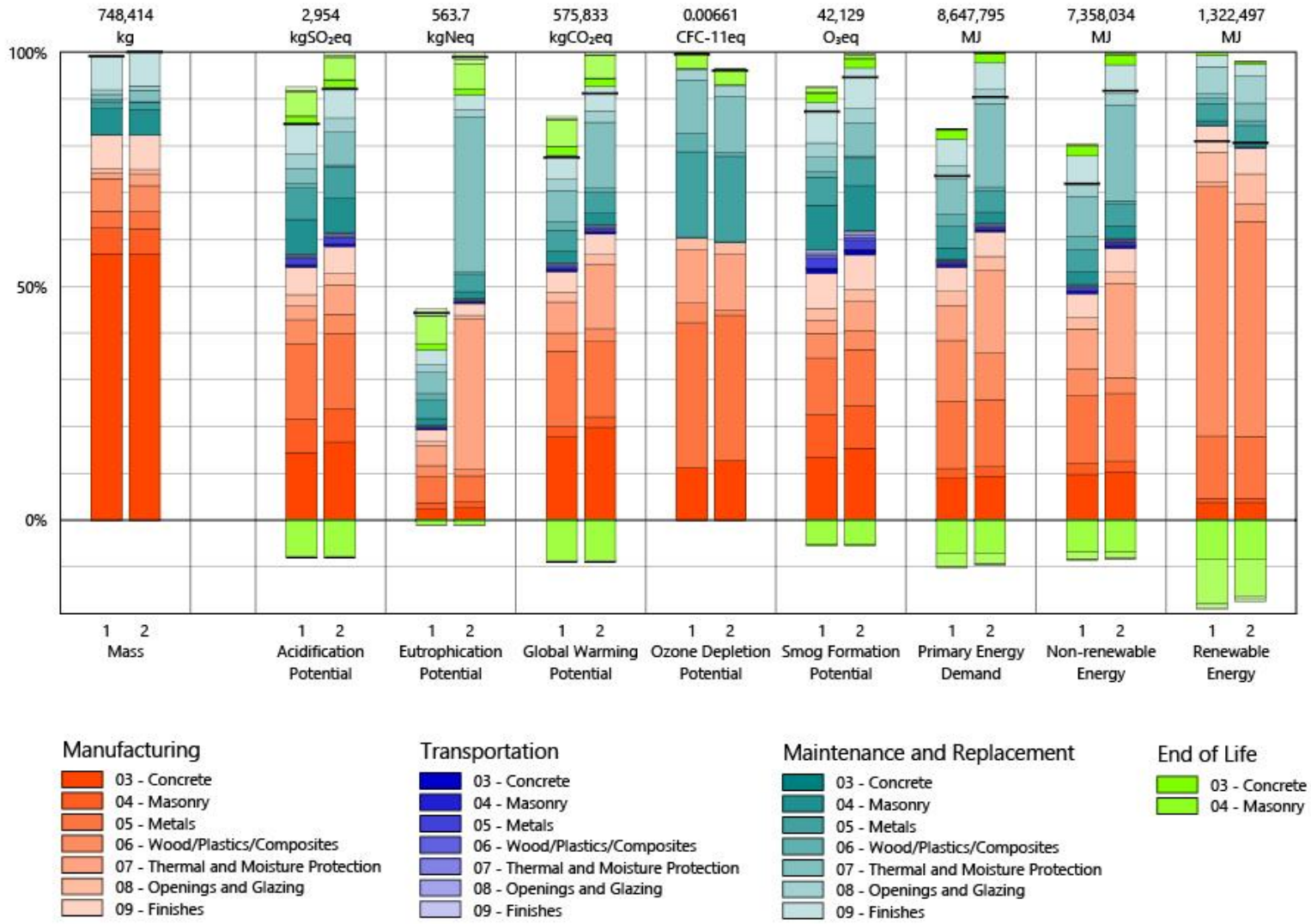


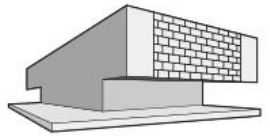
https://centerforgreenschools.org/sites/default/files/resource-files/green-schools-investment-guide.pdf

UPFRONT COST	The sum of the initial costs incurred to implement and commission an improvement
RECURRING COST	A cost incurred on a regular basis over the useful life[1] of an improvement (e.g. maintenance costs, energy costs)
ANNUAL COST SAVINGS	The recurring savings generated by an improvement (e.g. maintenance savings, energy savings) measured on a yearly basis
LIFECYCLE COST	The sum of all one-time and recurring costs over the useful life of an improvement, or *total cost*
SIMPLE PAYBACK PERIOD	The time required to recover the initial cost of an improvement through cost savings. This number is the inverse of the *return on investment*.
RETURN ON INVESTMENT	A measure of profitability calculated as such: $\frac{\text{Gain (Total Cost Savings) - Lifecycle Cost (Initial Cost + Recurring Costs)}}{\text{Lifecycle Cost}}$

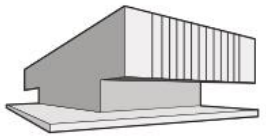
https://centerforgreenschools.org/sites/default/files/resource-files/green-schools-investment-guide.pdf

Results per Life Cycle Stage, itemized by Division

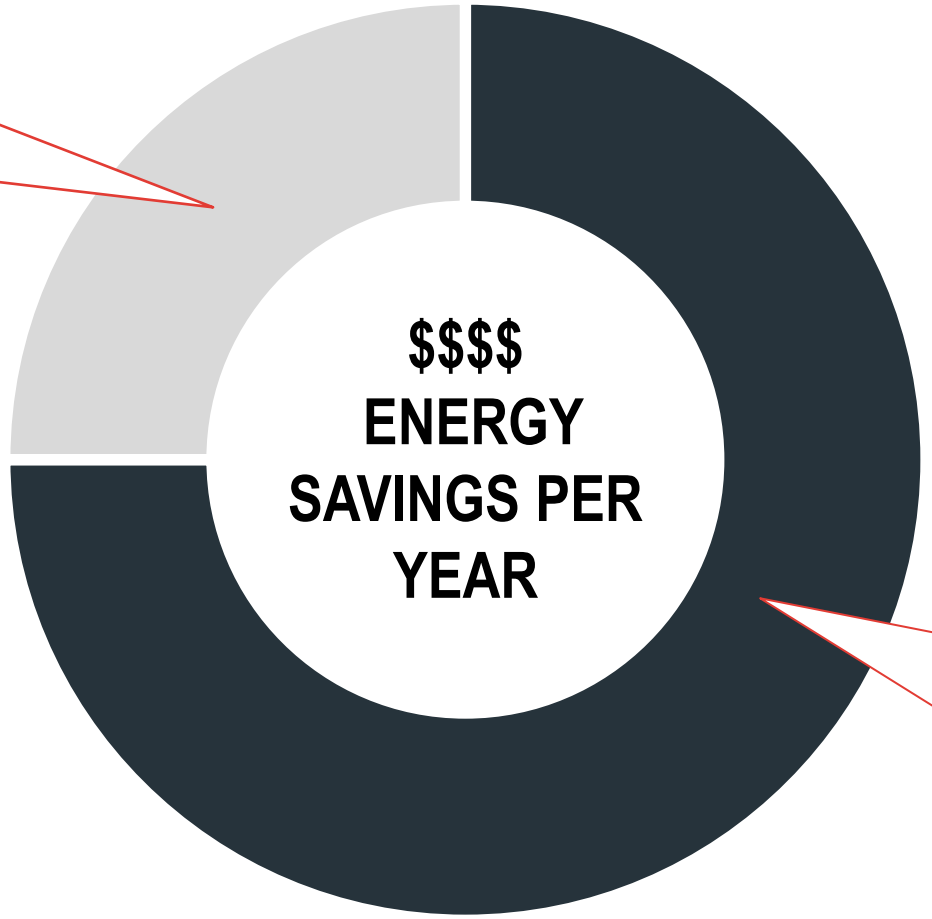




Option 1



Option 2



Less than ¼ of those savings are from solar panel production

GATEWAY HIGH SCHOOL
CASTALDI REPORT
SECURITY AND FACILITIES
CONDITION ASSESSMENT

CASTALDI

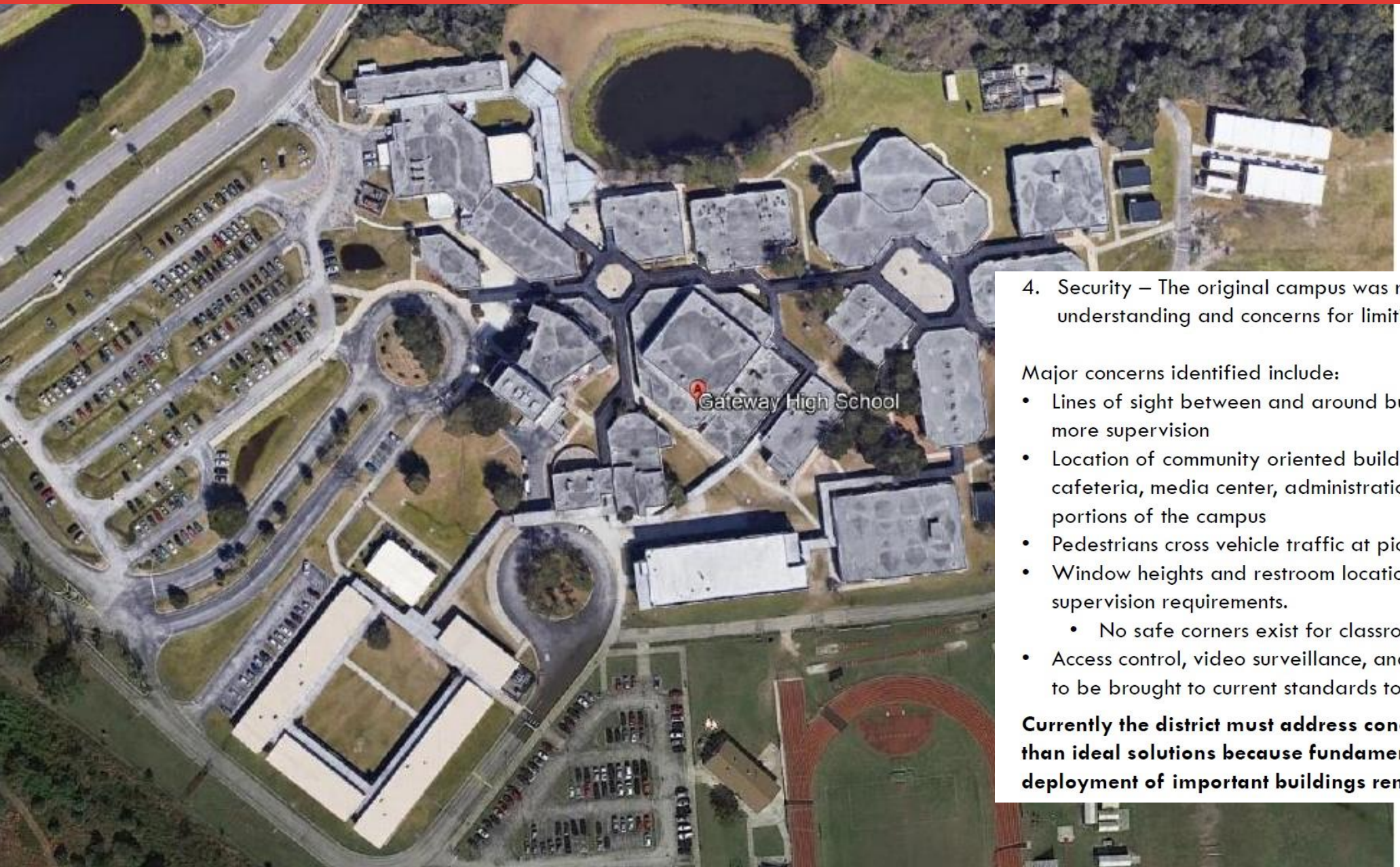
Cost of Replacement vs. Cost of Renovation

- Functional Adequacy
- Systems Adequacy
- Educational Adequacy
- General Conditions/Deferred Maintenance

Difficult to justify removal of buildings under 50 years old

Security was not a major consideration

- Post Marjory Stoneman Douglas HS shooting it became a higher priority
- Included a campus-wide security assessment helped Gateway HS to justify removal of several buildings in the 35-year range by showing how security was compromised
- Video summary of findings and requests was included - capturing the challenges of security, deferred maintenance, and other considerations.



4. Security – The original campus was not designed with the same understanding and concerns for limiting access as exist today

Major concerns identified include:

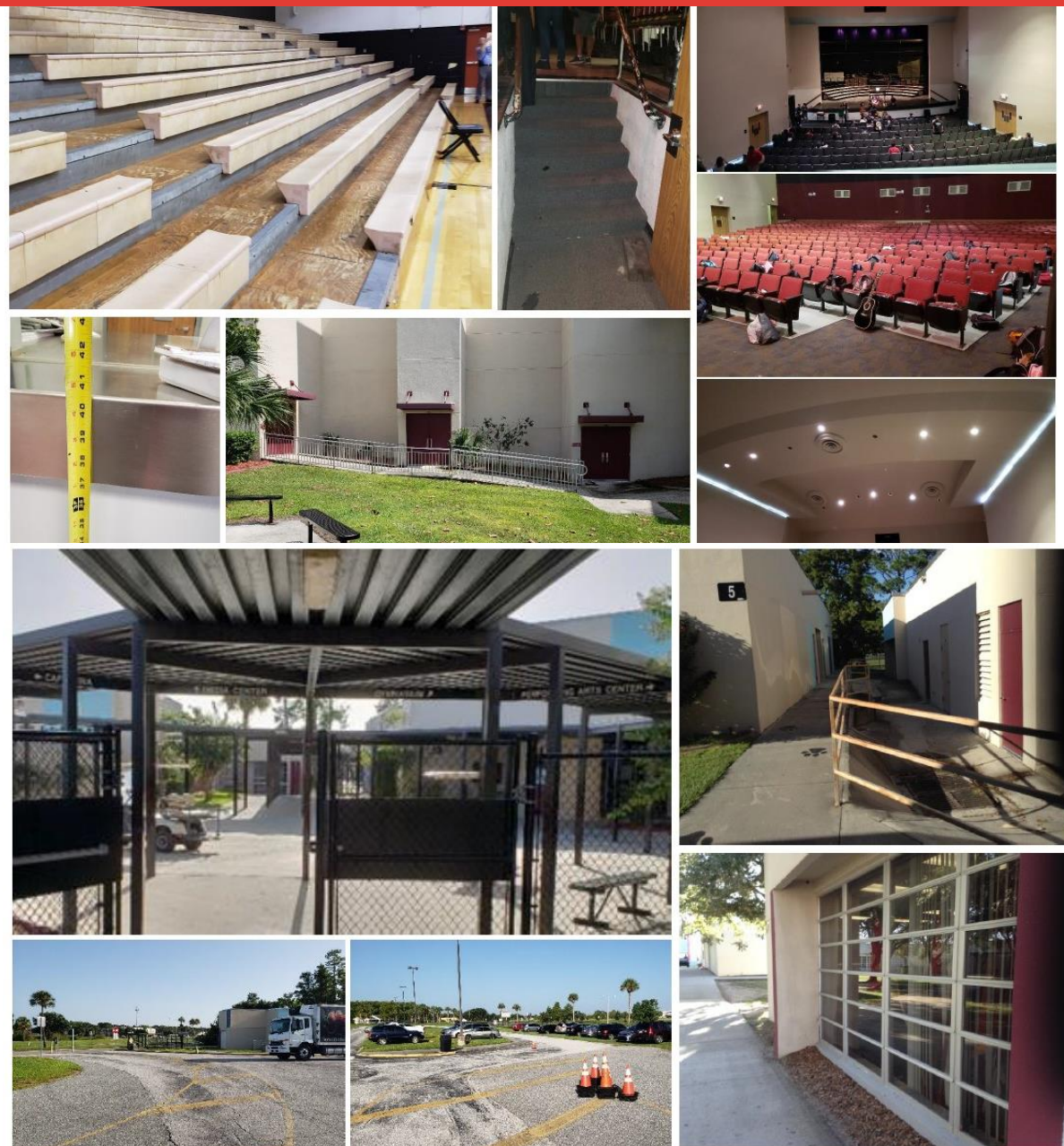
- Lines of sight between and around buildings require significantly more supervision
- Location of community oriented buildings (auditorium, gymnasium, cafeteria, media center, administration) require access to interior portions of the campus
- Pedestrians cross vehicle traffic at pick up/drop off times
- Window heights and restroom locations undermine safety and supervision requirements.
  - No safe corners exist for classroom buildings
- Access control, video surveillance, and mass notification system need to be brought to current standards to address today's security needs

Currently the district must address concerns with access using less than ideal solutions because fundamental issues with component deployment of important buildings remain.

EXECUTIVE SUMMARY

CASTALDI REPORT

- OEF form for demolition
- Castaldi calculations
- SDOC standards to gateway high school facilities list comparison
- Functional equity
- Systems adequacy
- Security assessment
- Facility assessment



CARES ACT

Educational Stabilization Fund available through September 30, 2022

ELEMENTARY/ SECONDARY RELIEF

- **$54.3 billion**
- **Learning Losses**
- **Improve School Facilities and Infrastructure**
- **Purchase Educational Technology**

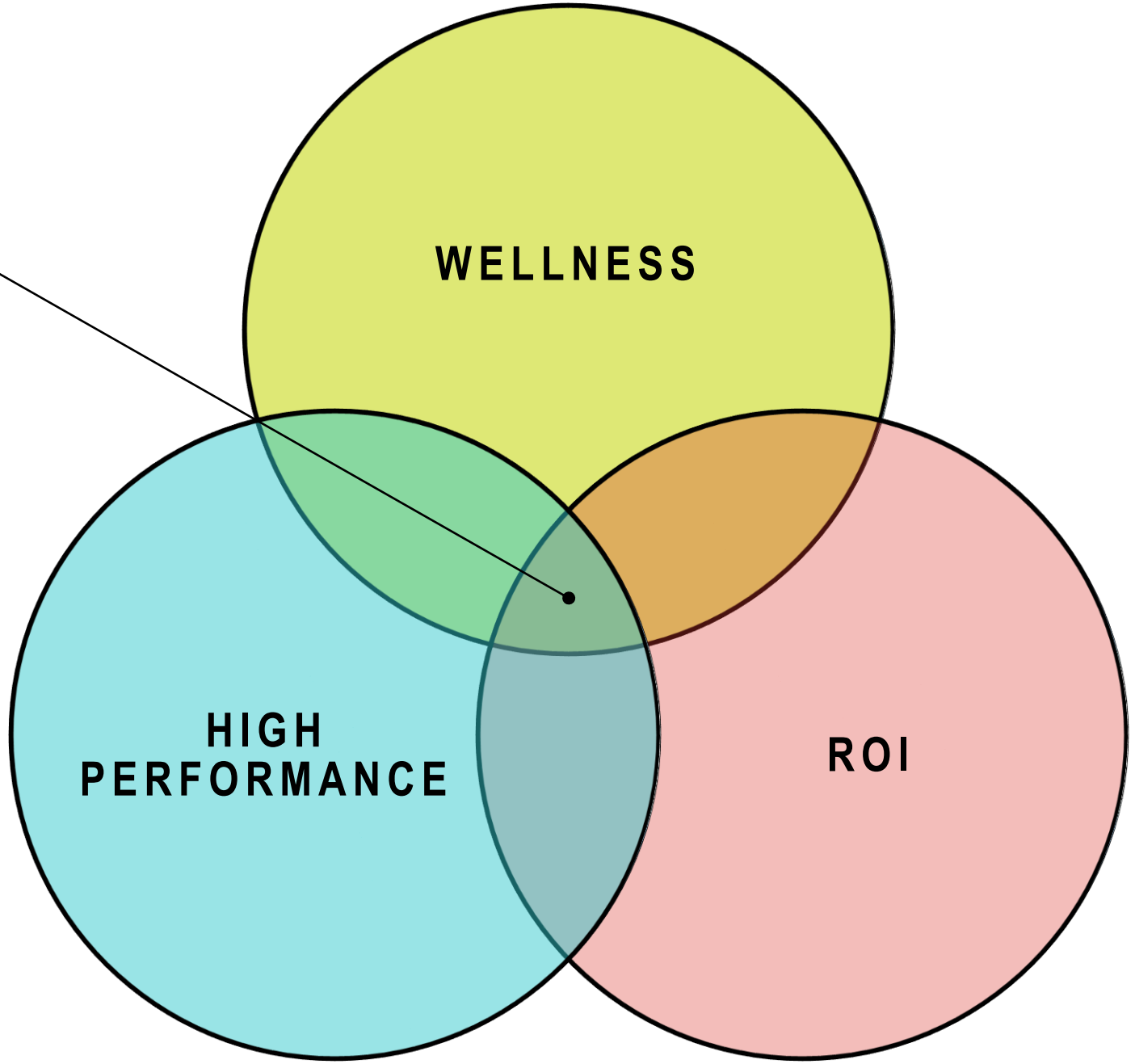
HIGHER EDUCATION RELIEF

- **$22.7 Billion**
- **$20.2 Billion allocated to public/ private/ and non-profit institutions.**

4

‘MASTERMOVE’

‘MASTERMOVE’



UNDERSTANDING THE VISION

NEO CITY ACADEMY

AT NEOCITY ACADEMY, AN INQUIRY-DRIVEN, PROJECT-BASED STEM CHOICE PROGRAM,

WE DEVELOP STUDENTS WHO BELIEVE THE WORLD CAN BE A BETTER PLACE AND THAT THEY CAN BE THE ONES TO MAKE IT HAPPEN.

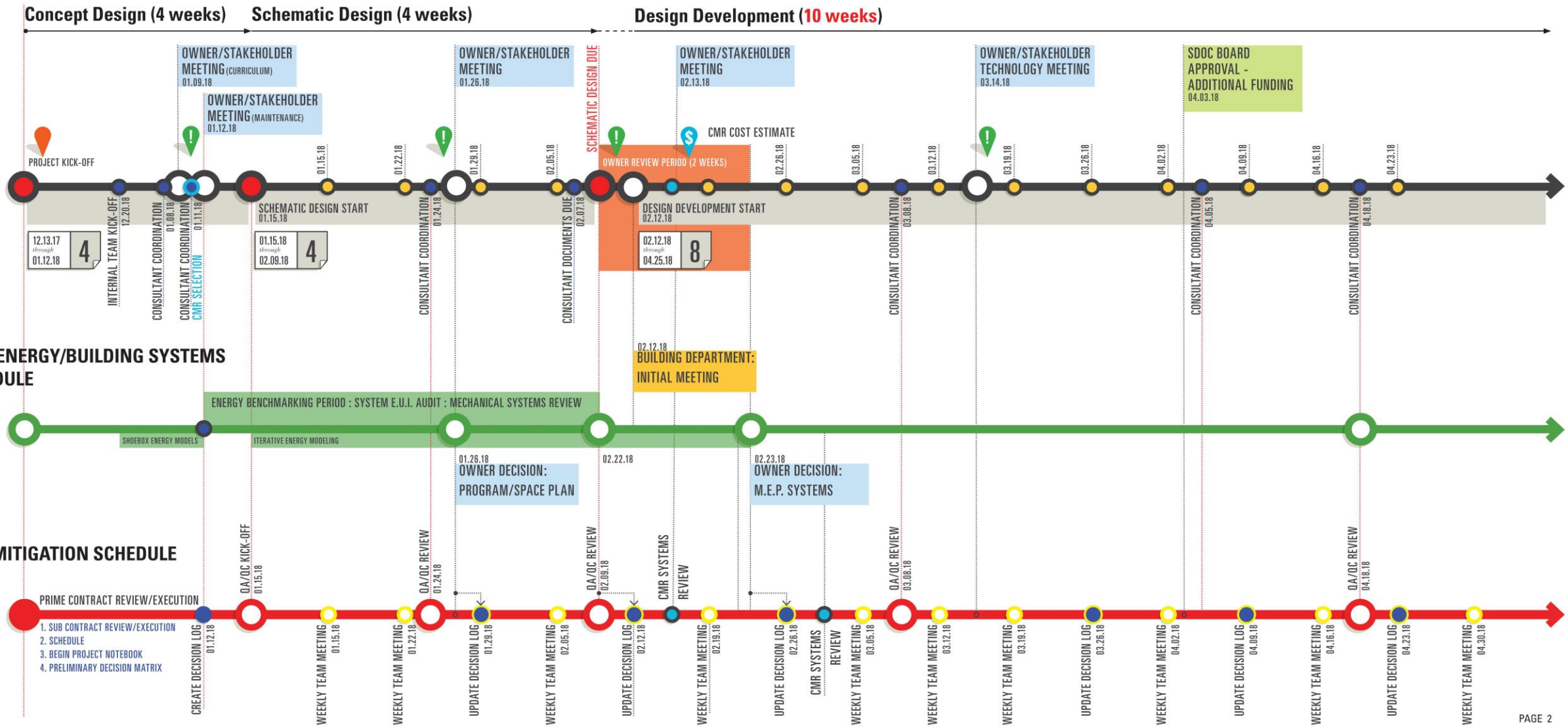
DESIGN DRIVERS

1. **Immersive Learning Environment (Collaboration + 21st C Skills + Active Learning)**
2. **High Performance Building Facility**
3. **Flexible**
4. **Adaptable**
5. **Efficient & Effective**
6. Microcosm of the BRIDG (Ideas + Industry) – “Simulate the Experience”
7. Strong Connection to NEOCITY Partners + UCF
8. Transparency: “See Learning Happening”
9. Colorful & Energetic Environment
10. EUI 20
11. FIRST Net Zero Energy School in Florida
12. Inspire Learning at a Higher Level
13. Create a Culture of Innovation, Creativity + Problem Solving
14. WELL Inspired Learning Environment
15. Use Building as a Teaching Tool

“PLAN THE WORK, WORK THE PLAN”

LITTLE

MASTER SCHEDULE



ZERO ENERGY/BUILDING SYSTEMS SCHEDULE

RISK MITIGATION SCHEDULE

QA/QC

PROGRAMMING

PHASE 1 - HIGH SCHOOL	
1	45,000 SF
2	500 Students
3	25/1 Student Teacher Ratio
4	125 Kids / Grade

PHASE 2 - MIDDLE SCHOOL	
1	45,000 SF
2	500 Students
3	25/1 Student Teacher Ratio
4	125 Kids / Grade

3 KEY ENGINEERING-BASED SPECIALTIES

- Engineering
- Bio-Med Engineering
- Cyber-Security

YEAR 1 - INTRO TO ENGINEERING	
1	Chemistry
2	Biology
3	Physics
4	Fab-Lab

YEARS 2/3/4 - APPLIED ENGINEERING	
1	Engineering +
2	Bio-Medical
3	Cyber-Security
4	Advanced Manufacturing
5	Fab-Lab
6	Online Courses

** Partner with County + BRIDG

State Requirements for Educational Facilities

2014

Florida Department of Education
Office of Educational Facilities

FISH Code	Grade Group	Facility Space Name	Recommended Occupants	Teacher Stations	NSF/ Occupant	Related Space
		1. GENERAL EDUCATION SPACE (N-12)[1]				
		a. Core curricula				
001	PK-3	Primary	*18	1	49	808, 811, 813, 814
002	4-8	Intermediate/Middle	*22	1	39	808, 811, 815, 816
003	9-12	Senior High	*25	1	32	808
010	PK-3	Primary - Skills Lab (1 per each 350 student stations or major portion thereof without FISH capacity, additional rooms will have capacity)	*18	1	49	808, 813, 814
011	4-8	Intermediate/Middle - Skills Lab	*22	1	39	808, 815, 816
012	9-12	Senior High - Skills Lab	*25	1	32	808
020	4-8	Intermediate/Middle - Science Demonstration	*22	1	37	808, 812
021	4-8	Intermediate/Middle - Science Lab	*22	1	51	808, 812
022	9-12	Senior High - Science Demonstration	*25	1	37	808, 812
023	9-12	Senior High - Science Lab	*25	1	51	808, 812
030	PK-3	Primary - Open Plan	*36, 54, 72	2, 3, 4	38	808, 813, 814
031	4-8	Intermediate/Middle - Open Plan	*44, 66, 88	2, 3, 4	32	808, 815, 816
032	9-12	Senior High - Open Plan	*50, 75, 100	2, 3, 4	27	808
060	N-PK	ESE Pre-K	*5	1	95	808, 813, 817
061	PK-12	ESE Part-Time	*15	1	65	808, 813, 815, 816

Chapter 6 State Requirements for Educational Facilities Section 6.1

FISH Code	Grade Group	Facility Space Name	Recommended Occupants	Teacher Stations	NSF/ Occupant	Related Space
		b. Noncore Curricula Instructional Support				
040	PK-12	Resource Room (1 per each 150 stations or major portion thereof in elementary schools and 1 per each 250 stations or major portion thereof in middle/high schools without FISH capacity; additional resource rooms will have capacity)	*10	1	29	808
050	PK-5	Art - Elementary (1 per each 500 student stations or major portion thereof without FISH capacity; additional rooms will have capacity)	*22	1	1,000	808, 812
051	4-8	Art - Intermediate/Middle	*30	1	42	803, 805, 808, 812
052	9-12	Art - Senior High	*30	1	53	803, 805, 808, 812
064	PK-12	ESE PT/OT	5	1	95	808, 813, 817
065	PK-12	ESE Resource (1 per each 350 stations or major portion thereof without FISH capacity; additional ESE resource rooms will have capacity)	*4	1	95	808, 813
066	PK-12	ESE Supplemental Instruction	2	1	50	808
067	PK-12	ESE Observation Booth			150	
068	PK-12	ESE Time Out			40	
069	PK-12	ESE Audiology Lab			250	808
070	PK-12	Itinerant	4	1	50	808

LEARNING

CAPSTONE
Finish
Six Sigma

Florida Department of Education
Curriculum Framework

2017 – 2018

rogram Title: Advanced Technology Applications
Program Type: Non Career Preparatory
Career Cluster: Engineering & Technology Education

Secondary – Non Career Preparatory	
Program Number	8601900
CIP Number	08210200CP
Grade Level	9 – 12; 30, 31
Standard Length	1 credit (Maximum of 3 credits)
Teacher Certification	Refer to the **Course Structure** section
CTSO	FL-TSA, SkillsUSA
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

TEAMWORK.

The purpose of this course is to serve as a capstone course to provide Engineering and Technology Education students with the opportunity, to develop a project from "vision" to "reality". Working in teams to design, engineer, manufacture, construct, test, redesign, test again, and then produce a finished "project". This would involve using ALL of the knowledge previously learned, not only in technology education, but across the curriculum. ← CROSS CURRICULARLY.

DESIGN THINKING

To enroll in Advanced Technology Applications, a student must have:

1. Completed three credits of an Engineering & Technology Education program.
2. Received permission of the supervising Engineering & Technology Education Instructor and or Faculty Team.

This Advanced Technology Applications course may be taken by a student for one or more semesters. A student may earn multiple credits in this course (maximum of three).

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

SELF DRIVEN!

Engineering Capstone Course.
year 4 to the Applied Engineering pathway

Course Structure

This program of instruction consists of one course.

.he following table illustrates the secondary program structure:

Course Number	Course Title	Teacher Certification	Length
8601900	Advanced Technology Applications	*Since this program serves as a capstone experience for the student, the teacher certification must be appropriate to the student's Engineering & Technology program of study and the teacher certifications specified in the respective curriculum framework.*	1 credi

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

MEETING SPACE.. TOUCH POINTS

** Note: Students may earn multiple credits (maximum of 3 credits) in this course.*

The Advanced Technology Applications program must include the following components:

Pre-Project Planning Conference: The student, teacher, and team members must participate in a pre-project planning conference, which is essential to designing advanced learning experiences that are appropriate for each individual's learning needs and career interests. It is critical that all parties involved understand and agree on time schedules, expectations, advanced learning applications and evaluation criteria.

COSTA EXPER.

Project Criteria: The following criteria shall be met when choosing the Advanced Technology Applications Project:

The project must allow experiences that utilize both skills and knowledge directly related to the student's career interests and the Engineering & Technology Education program in which the student is enrolled or has completed.

The project must provide opportunities for rotation through a wide variety of advanced applications in technology tasks.

The project must provide a safe and ethically sound environment with up-to-date facilities and equipment.

Each student must maintain a journal with daily entries describing:

DESIGNING THE PROJECT - DIGITAL SUCCESS WHITE BOARD PROJECTS

(a) Time spent on the project (log in and log out)
(b) Description of the activity for the period(s)
(c) Materials/equipment/fixtures used
(d) Problems identified
(e) Possible solutions to problems identified
(f) Work accomplished
(g) Solutions attempted
(h) Solutions that failed
(i) Which led to a new problem statement
(j) Video or Still Images of the project as it progresses.
(k) Plans, sketches, drawings, patterns, fixtures or other documentation of components manufactured or constructed

FROM IMAGE TO IPAD TO PRESENTATION.
FROM WHITEBOARD TO IPAD

Each student must maintain a portfolio of the project to include:

(a) Bibliography of all research materials accessed.
(b) A written research paper describing the background information the project is to be based on.

(c) A Laboratory Report to include:
1. A clear statement of the project
2. A hypothesis or description of the area of investigation.
3. A written procedure of each activity as it is accomplished.
4. List of materials used in each activity.
5. Data recovered in the form of a data table, charts graphs.
6. Conclusion
7. Bibliography

(d) Safety concerns and procedures to be followed.
(e) An abstract.

EXHIBIT CAPSTONE PROJECTS - a. la. STETSON U.

IN PART PANEL - PROJECTS PRESENTATION?

A progress report at mid-term will be given by each student to include a written research paper, that describes the area of investigation and an oral presentation to the remainder of the class and instructor or supervising faculty team, on the progress of the project, and all work accomplished. The progress report will be the basis for the mid-term evaluation grade.

A final oral progress report presentation at the end of the course will be given by each student or team that includes:

(a) a review of the portfolio and the journal,
(b) a description of the experiment, process or activity
(c) results
(d) problems identified and solutions that worked or did not work, and
(e) a conclusion.

"CULTURE OF INNOVATION + IDEAS"

The final progress report will be the basis for the final exam evaluation grade.

When offered for multiple credits, the student should have varied learning experiences in order to provide maximum education exposure.

The course may be supervised by a faculty team consisting of the members of the faculty who will be granting the multiple credit(s) if that is the case.

Project Experience: This component shall provide a match between the student's career interests and a project based situation that will provide exposure to the broad aspects of the selected industry. The assigned tasks should allow a progression and rotation through experiences requiring a variety of knowledge, skills and abilities at increasingly higher levels related to the student's Engineering & Technology Education studies and career interests.

Experience Plan: A project experience plan must be developed and implemented for each student based on the curriculum frameworks of the Engineering & Technology Education program. The project experience plan must outline learning objectives, methods of learning, activities/ responsibilities, time required, student performance standards, provision for supervision, and method(s) of student evaluation. The project learning experience plan must be signed by the student and teacher.

THINK EXCHANGE!

Supervision: Teacher-coordinators of the Advanced Technology Applications project must monitor and support learning. Students must also be evaluated a minimum of once per grading period by the teacher-coordinator. The evaluation should assess how well the student is progressing toward goals established by the student teacher-coordinator. Portfolio assessment, orchestrated by the teacher-coordinator, is a recommended method of student assessment.

Academic Alignment Table

\cademic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparat programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions. EMPATHY
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
1. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

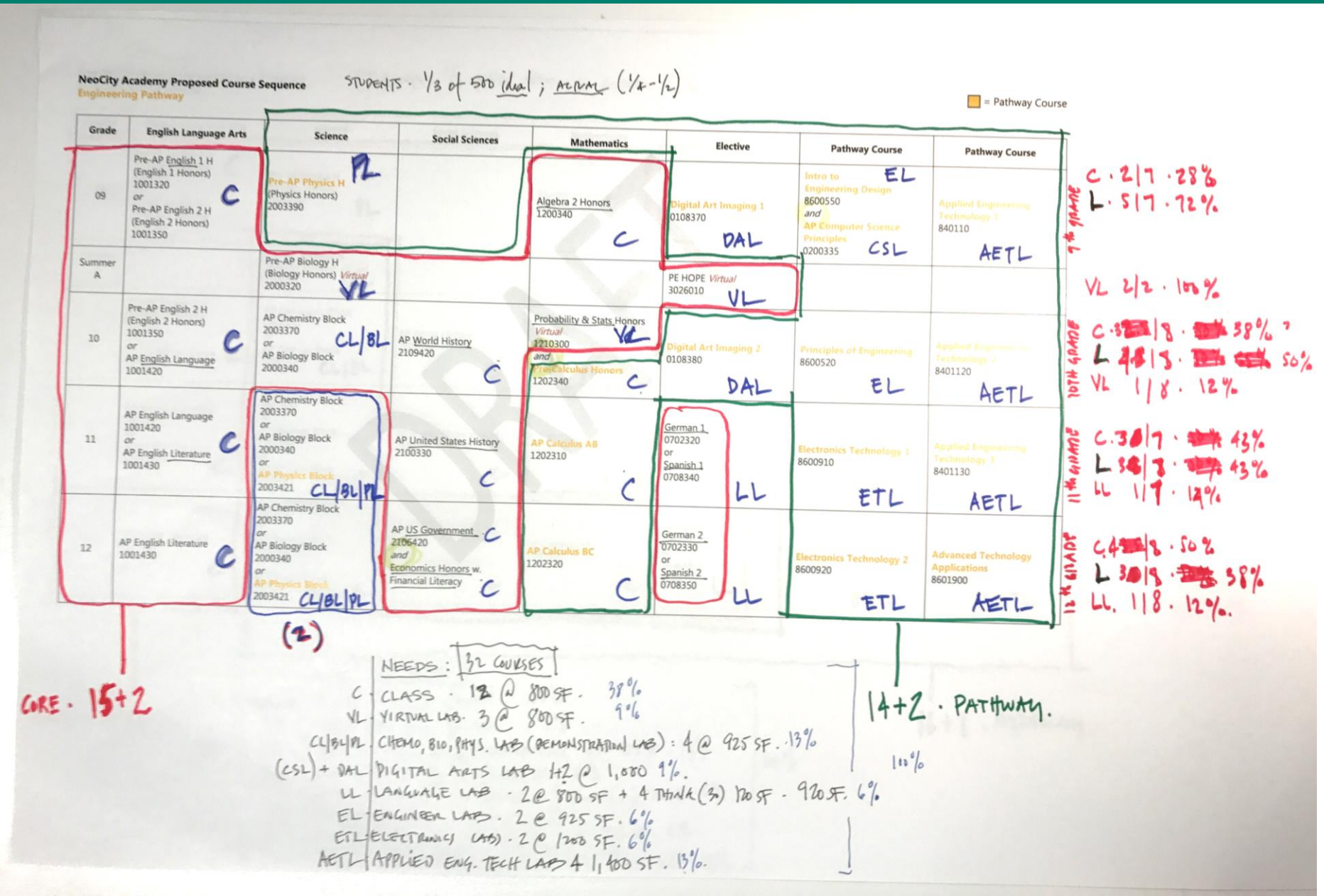
Standards

After successfully completing this program, the student will be able to perform the following:

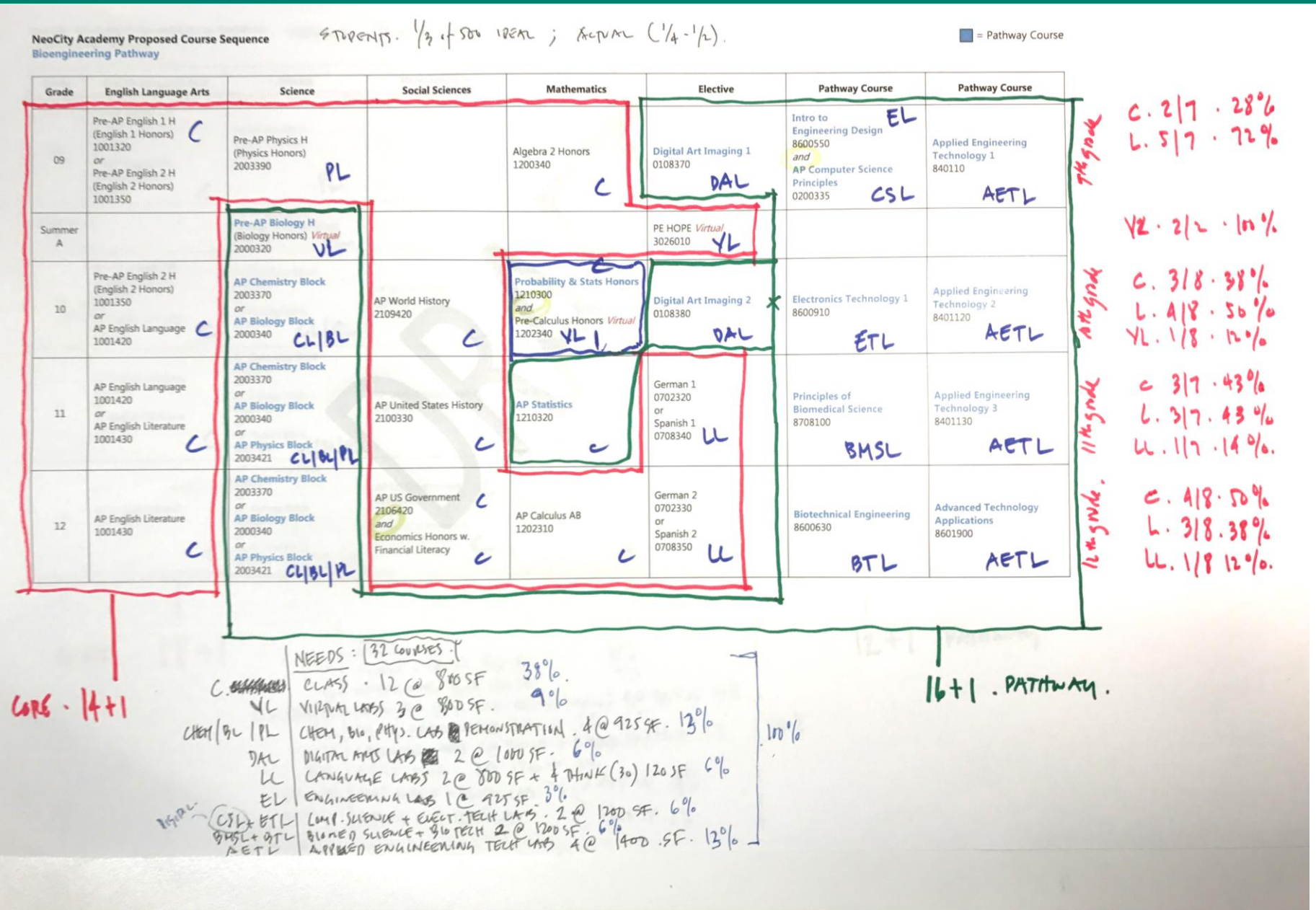
1.0 Complete a skills inventory.
02.0 Demonstrate acceptable work values.
03.0 Demonstrate the ability to identify and solve problems.
04.0 Successfully work as a member of a team.
05.0 Manage time according to a plan.
06.0 Keep acceptable records of progress, problems and solutions.
07.0 Plan, organize and carry out a project plan.
08.0 Manage resources.
09.0 Use tools, materials, and process in an appropriate and safe manner.
10.0 Demonstrate an understanding of the scientific process.
11.0 Demonstrate appropriate scientific content related to the project.
12.0 Demonstrate appropriate mathematics content related to the project.
13.0 Carry out a research assignment, and document the results of research efforts.
14.0 Use presentation skills, and appropriate media to describe the progress, results and outcome of the experience.
15.0 Demonstrate competency in the area of expertise related to the education program previously completed, that this project is based upon.

DESIGN DRIVERS - LEARNING

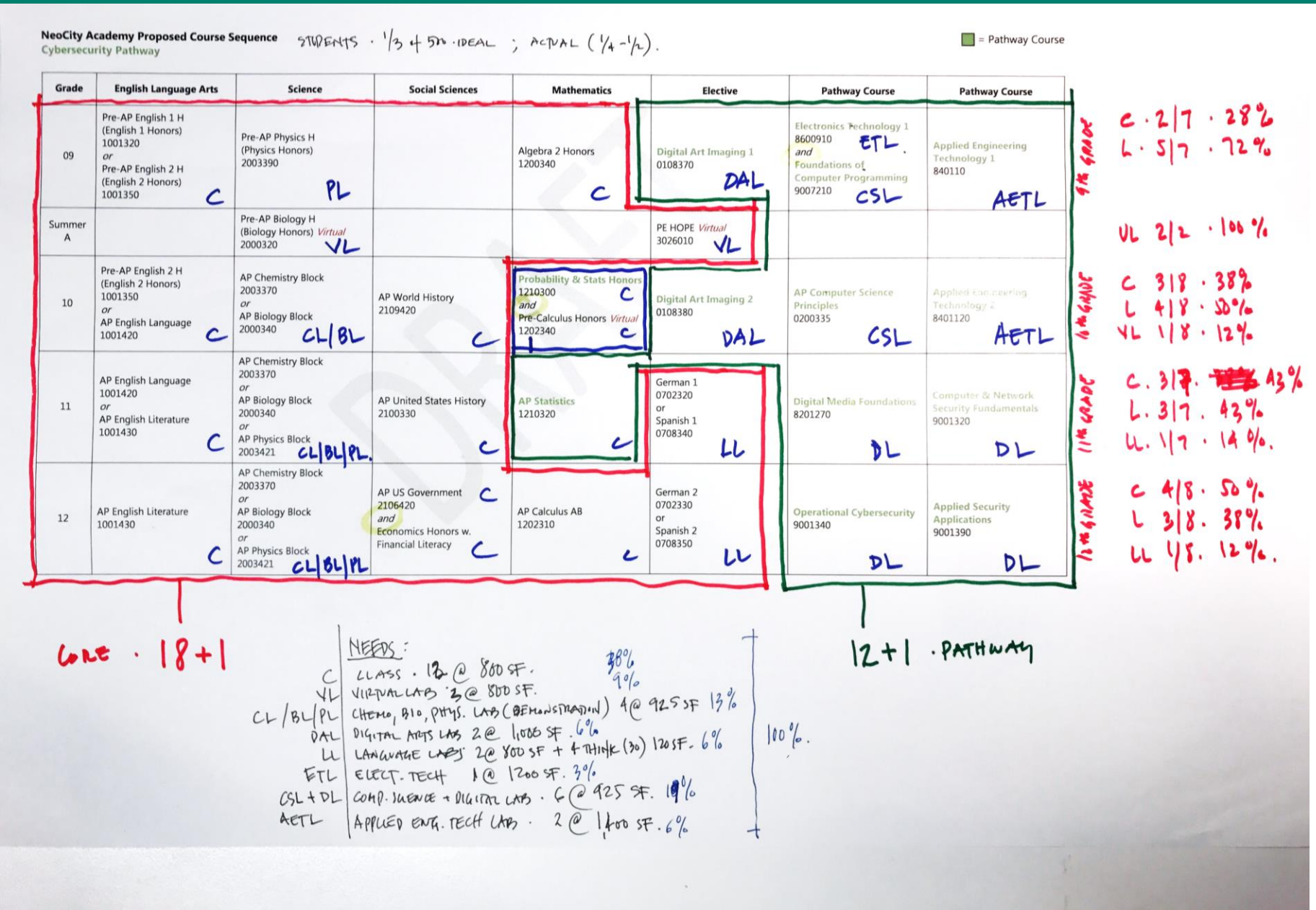
1. Cross-Disciplinary
2. Design Thinking
3. Self-Driven
4. Teamwork
5. Mentorship / Supervision / Guide
6. One-on-One Meetings
7. Customized Experience
8. Skills and Knowledge (Content)
9. Process-oriented
10. Capstone Projects – Culture / Exhib
11. Presentation Skills
12. Culture of Innovation and Ideas



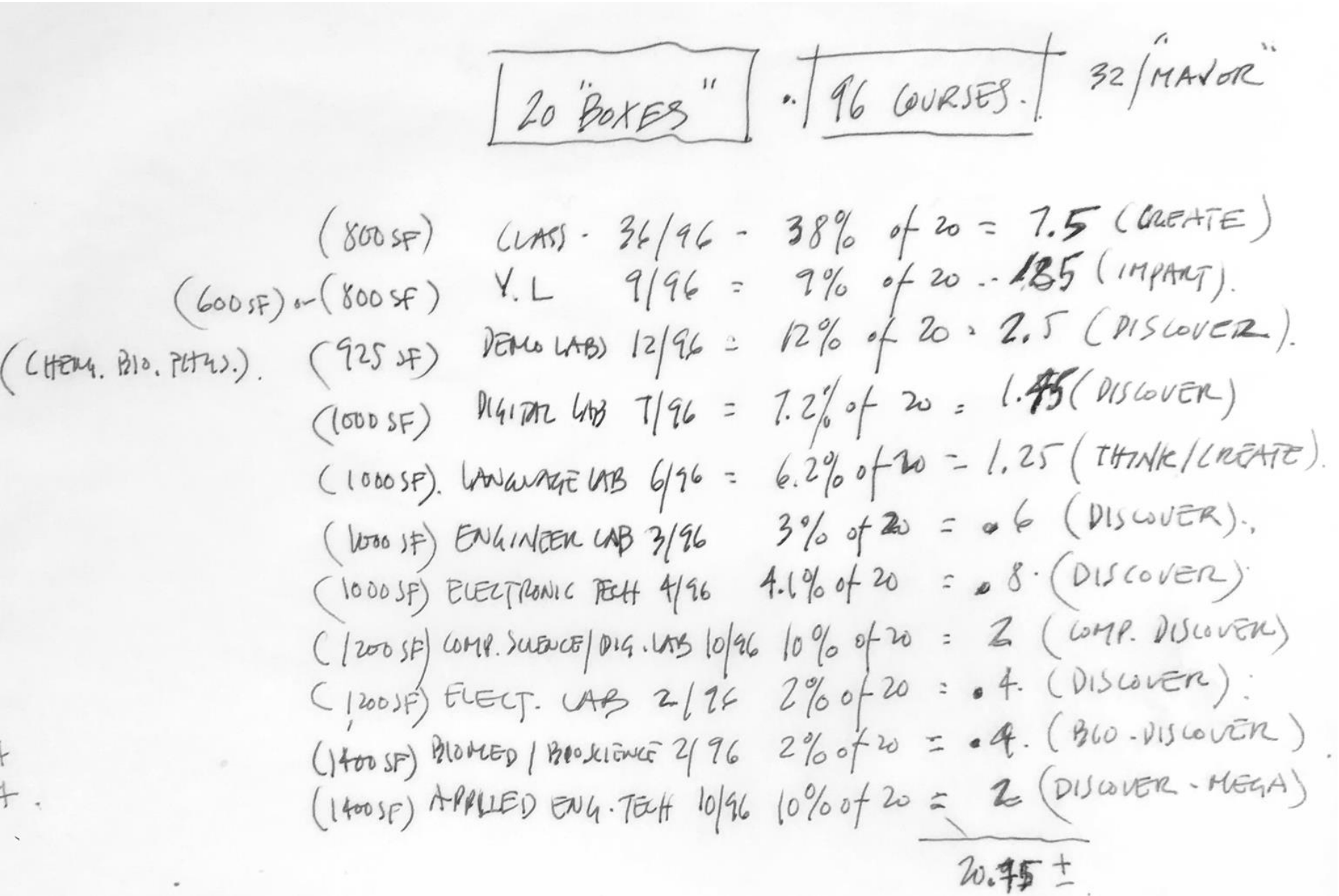
Engineering Pathway



Bio-Medical Engineering Pathway



Cyber-Security Pathway



20 'Boxes'
96 Courses

NeoCity Academy STEM High School - SCENARIO 6

Programming January 2018

500 STUDENTS
45,000 GSF
125 STUDENTS PER GRADE
1/25 TEACHER TO STUDENT RATIO

PROGRAM TYPE/SPACE	SF	# of rooms	Net SF
IMPART	250	4	1,000
THINK	30	17	510
CREATE	110	10	1,100
CREATE LABS	800	6	4,800
LOUNGE HUB / FLEX CREATE LAB	800	3	2,400
TRANSDISCIPLINARY FAB LABS	1,400	4	5,600
DEMONSTRATION LABS	975	4	3,900
DEMONSTRATION FAB LAB	900	2	1,800
PREP ROOMS	190	4	760
FAB LAB STORAGE	250	4	1,000
ADMINISTRATIVE SUITE	1,890	1	1,890
MEDIA-LOUNGE / FLEX / CAFÉ / EXHIBIT + BALCONY	5,256	1	5,256
TEACHER PLANNING	400	4	1,600
BRIDGE CONNECT (PARTNER SPACE) (part of HUB)			-
TOTALS			
Net square footage (NSF)			31,616
Gross multiplier			1.47
GROSS TOTAL (GSF)			46,476
Capacity			500
Gross square foot per student			93

Notes

Gross Square Foot = 45,000
Grossing Factor of 35% = 15,750 SF
Net Square Feet = 29,250 sf

Capacity will be infilled as program develops and is defined in accordance with Florida SREF

FLORIDA SREF LAB REQUIRMENTS	*Pages 103-121*		
	OCCUPANT	*SF/OCC*	*TOTAL SF REQUIRED*
Senior HS Skills Lab	*25*	*32/Occ*	*800*
Senior HS Science Demonstration	*25*	*37/Occ*	*925*
Senior HS Science Lab	*25*	*51/occ*	*1275*

FLORIDA SREF = 100SF

FLORIDA SREF = 34% | *Restrooms, Walls, Circulation, MEP*

SITE ANALYSIS / DESIGN

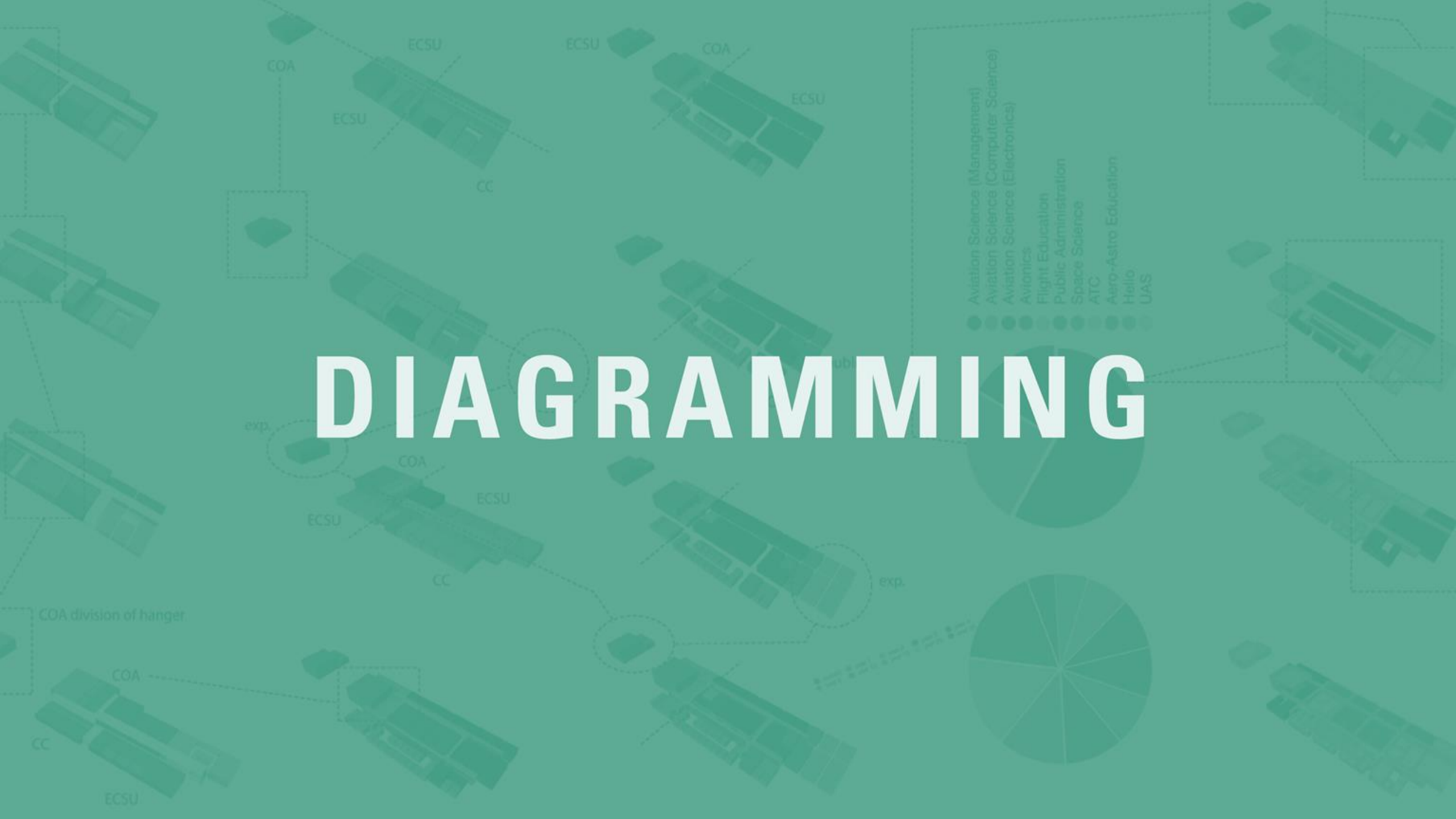
NEOCITY

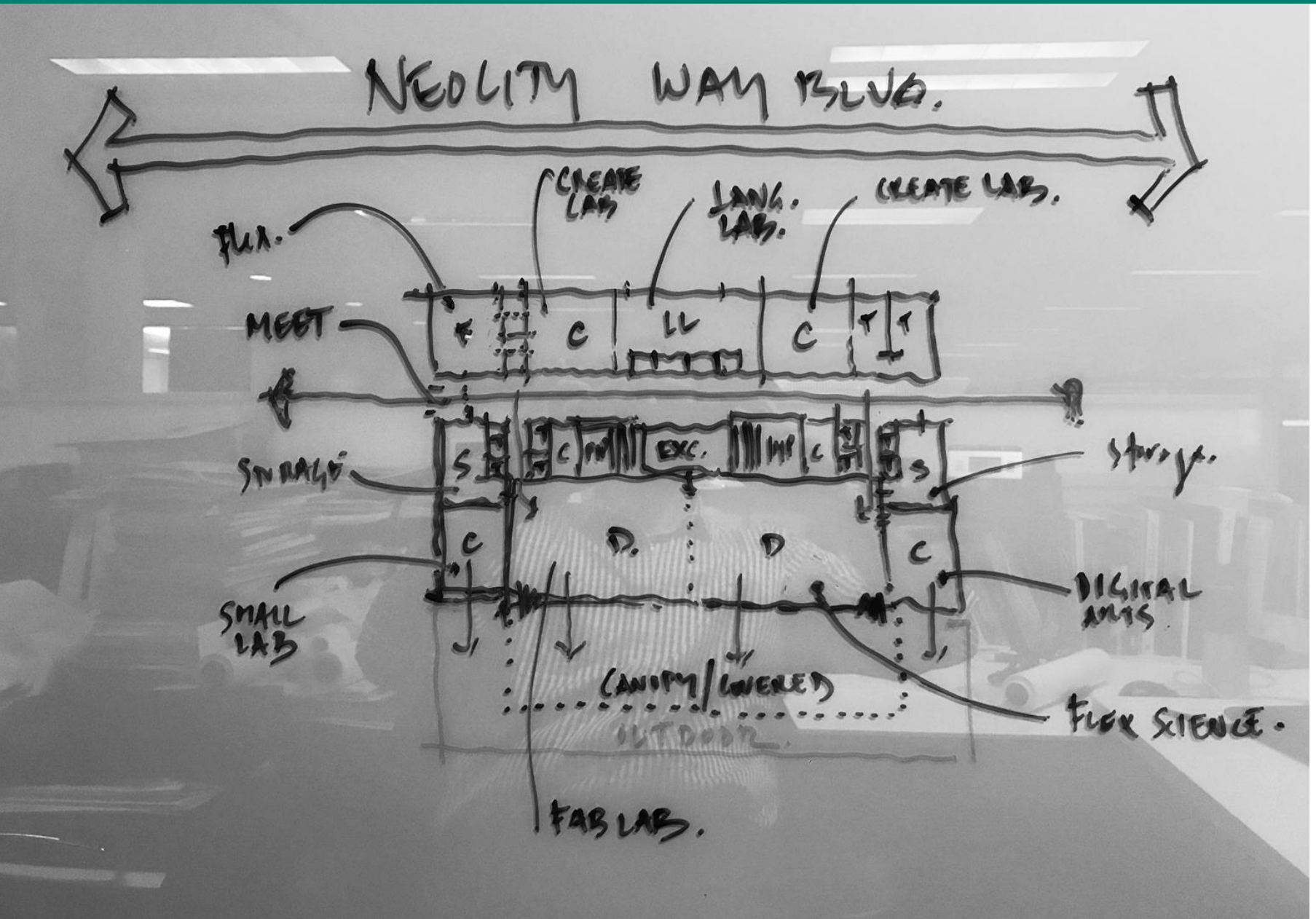
MASTERMOVE
SITE 4

NEOCITY

MASTERMOVE
SITE
4

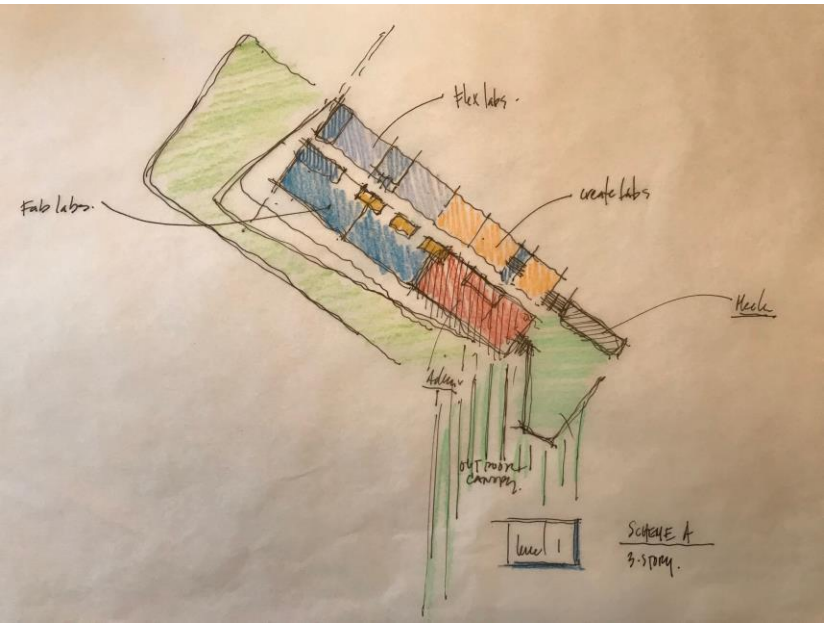
DIAGRAMMING

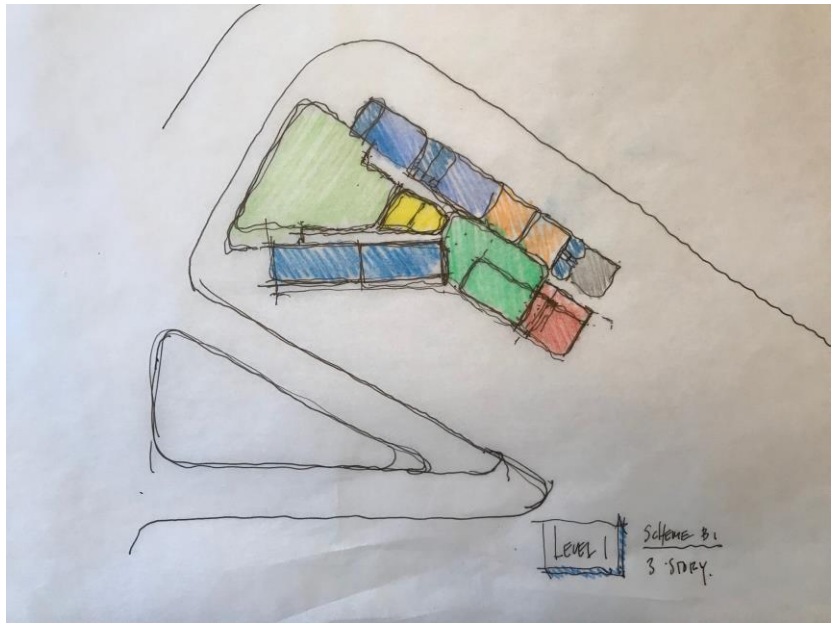


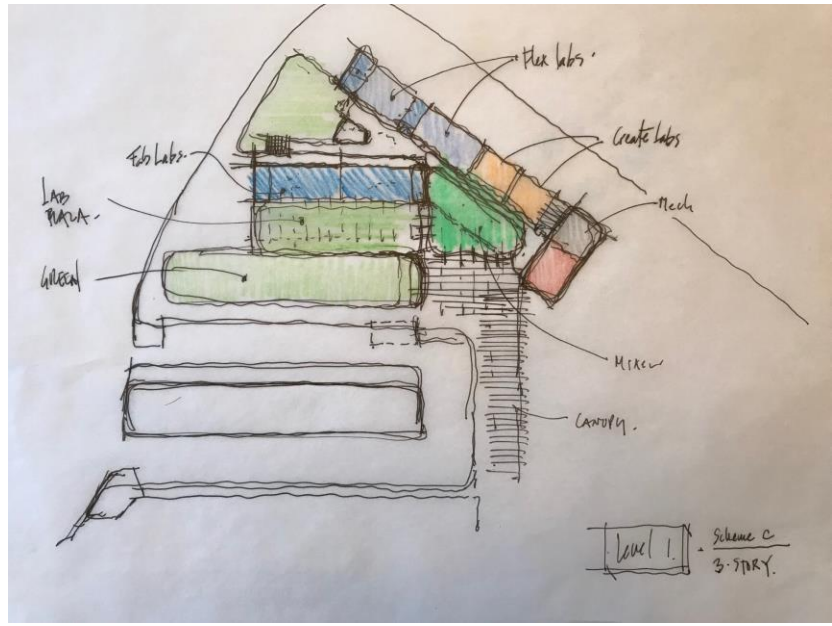


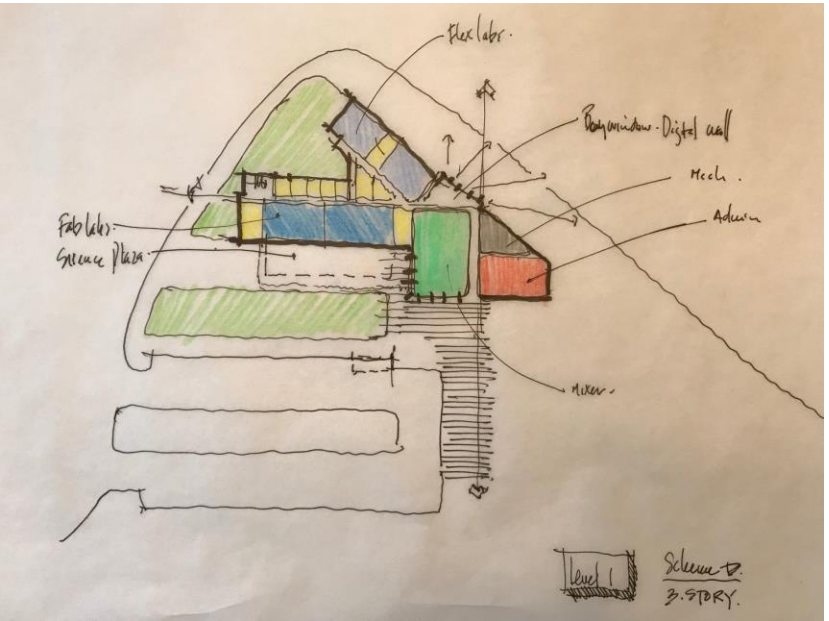
Module Diagram

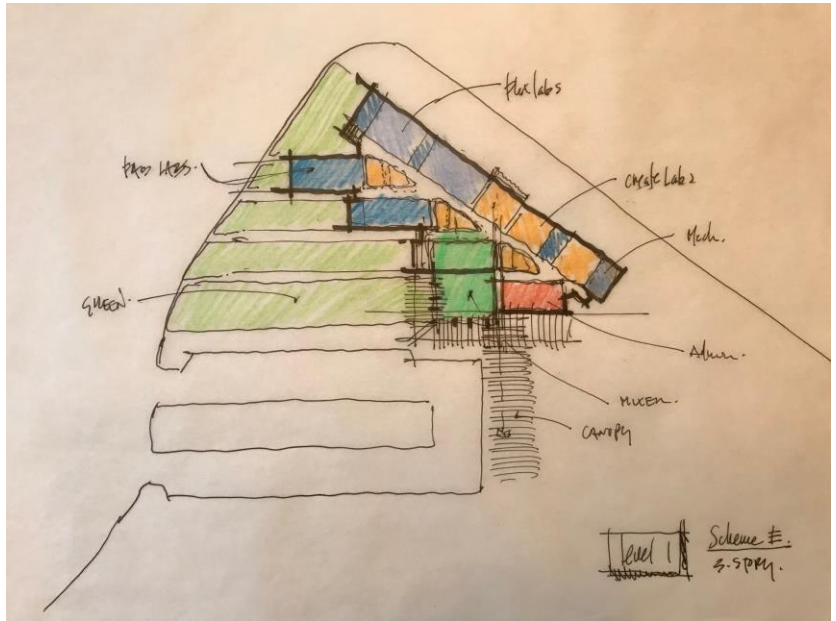
DIAGRAMMING - BRAINSTORMING

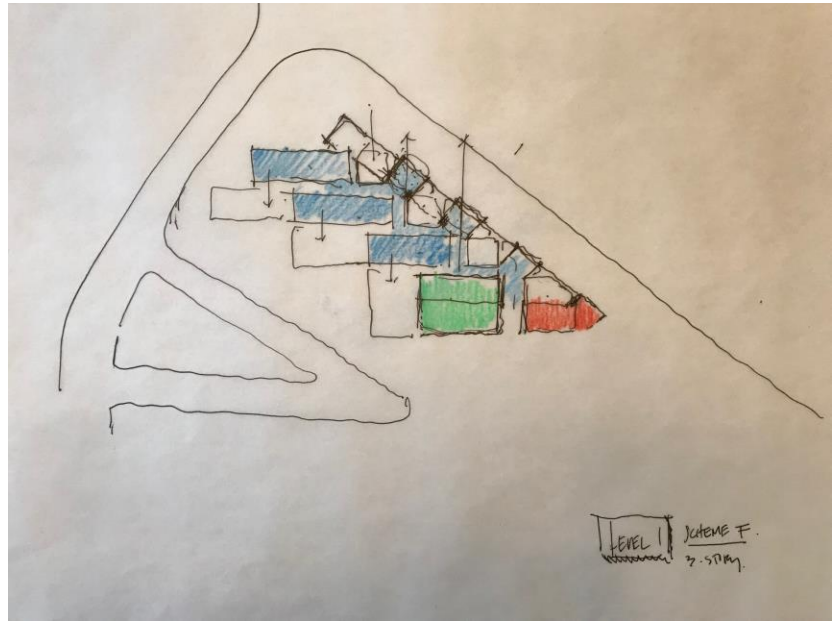


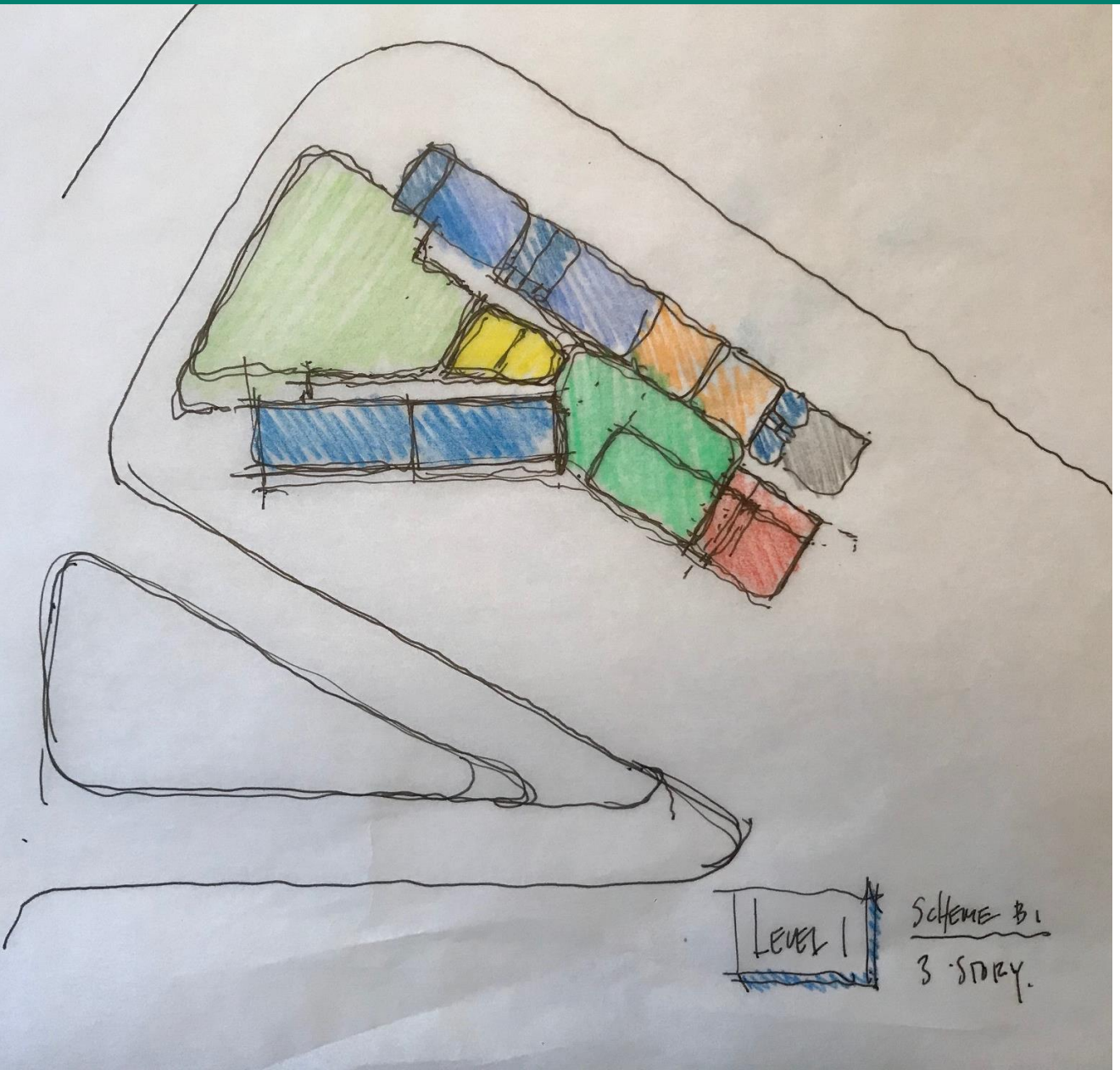


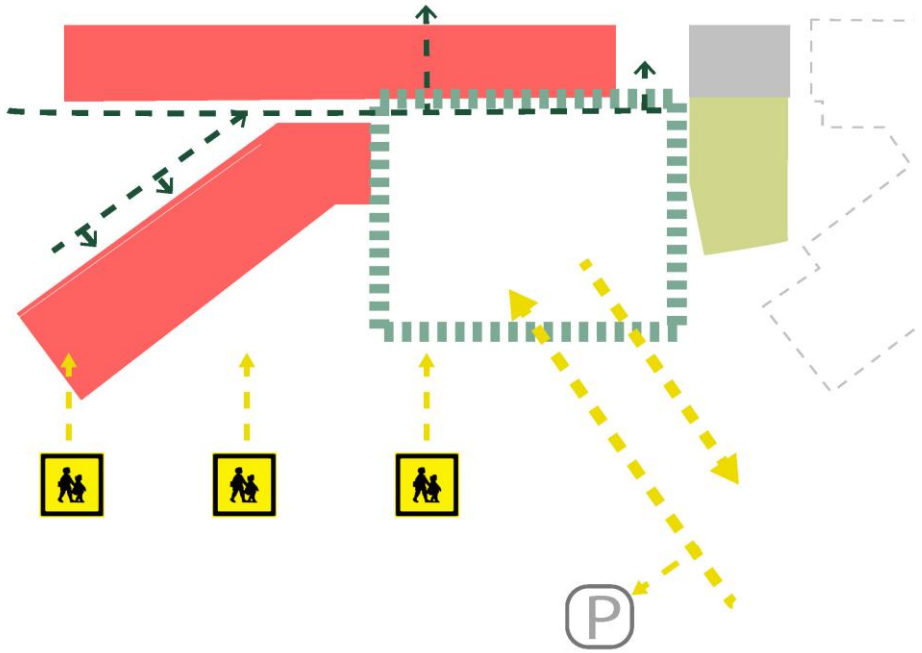









LEVEL 1
SCHEME B1
3 STORY.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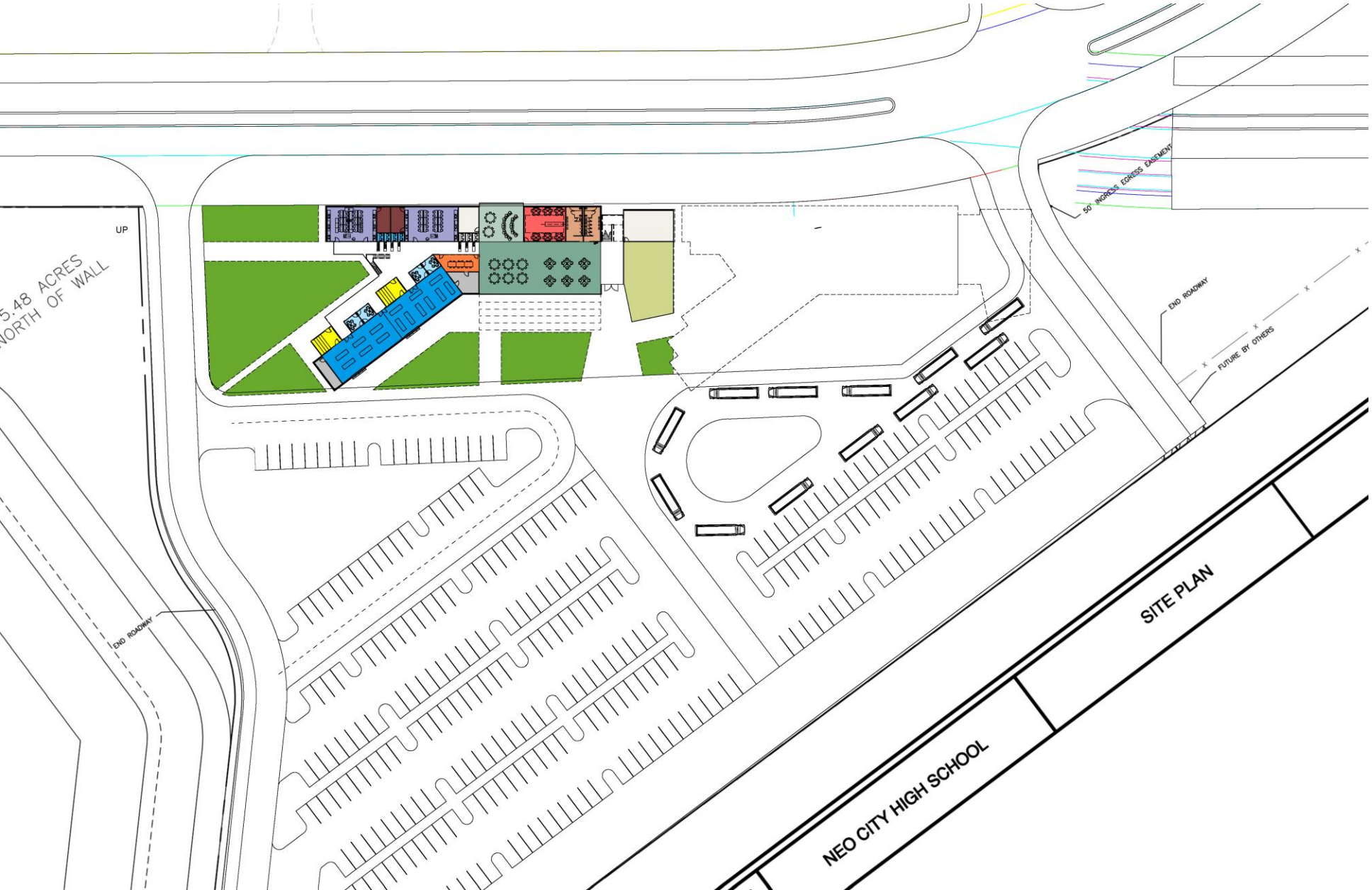
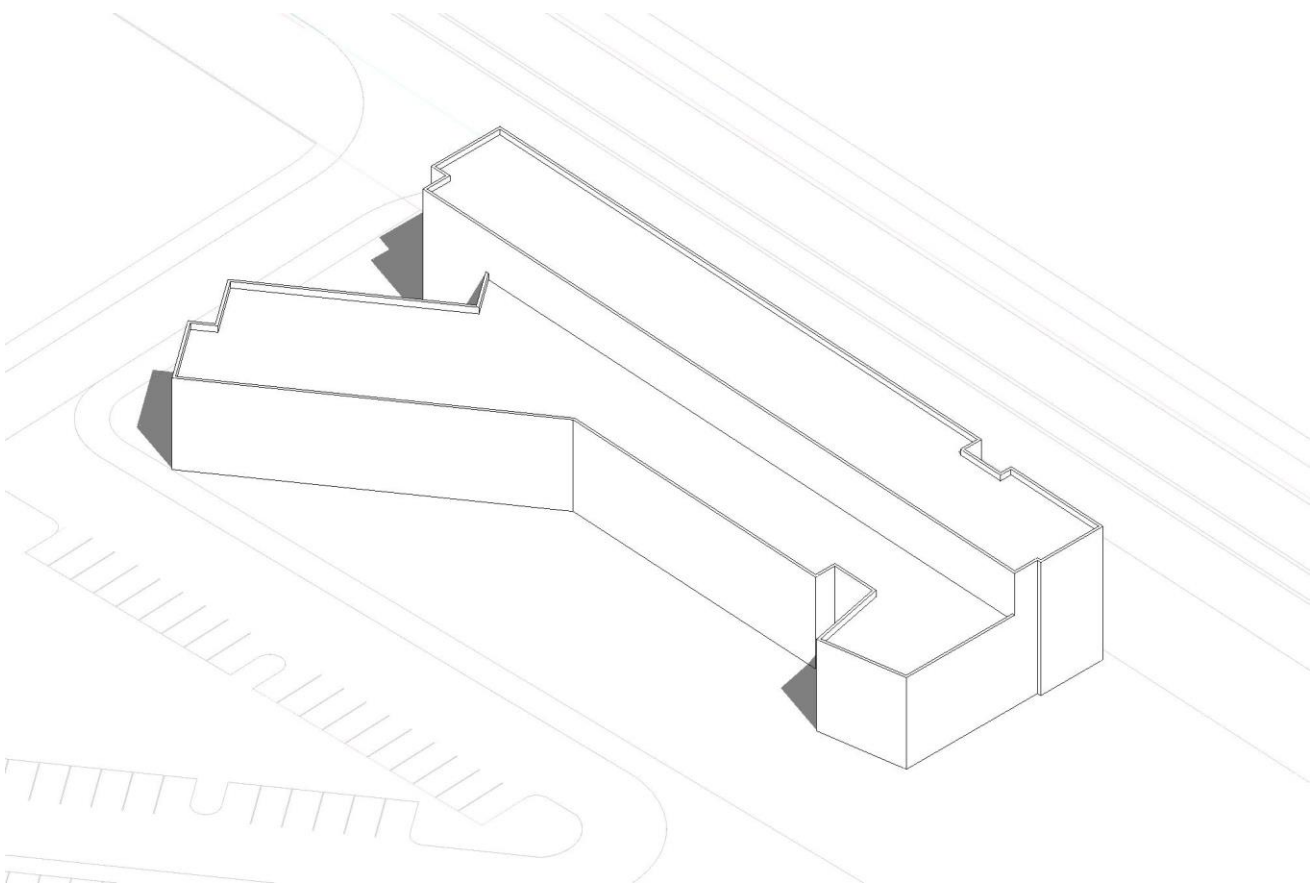
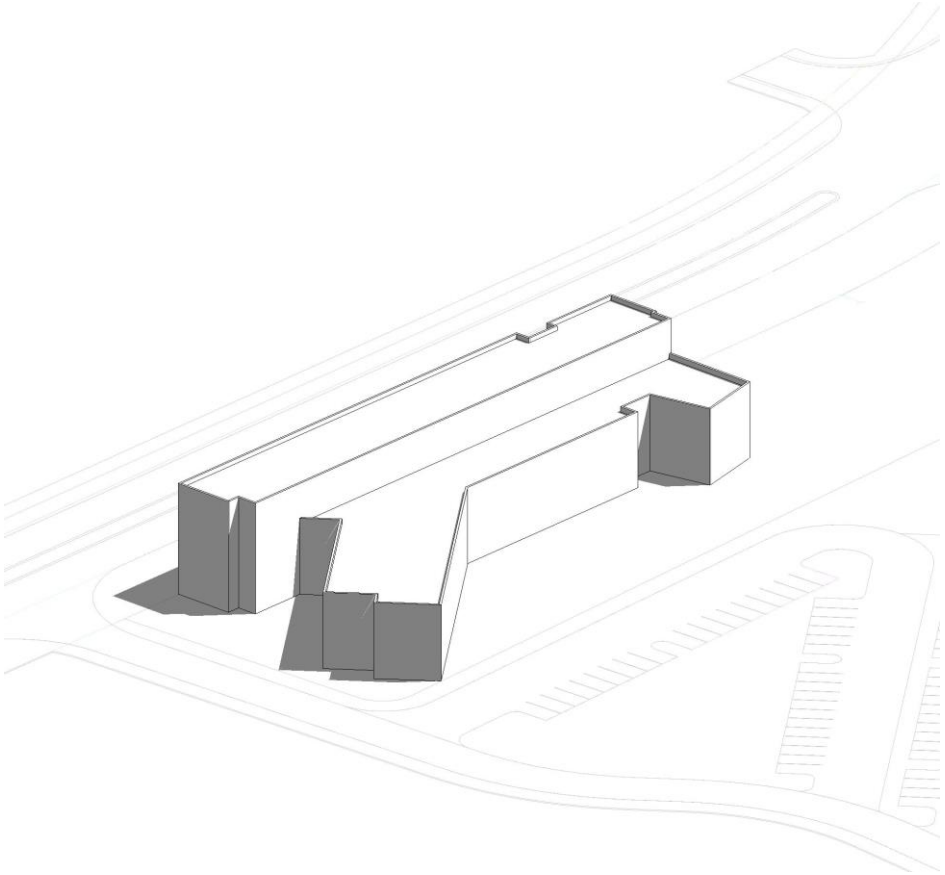


Site Plan
45,540 SF

PROGRAM – MASSING STUDY: SCHEME 1





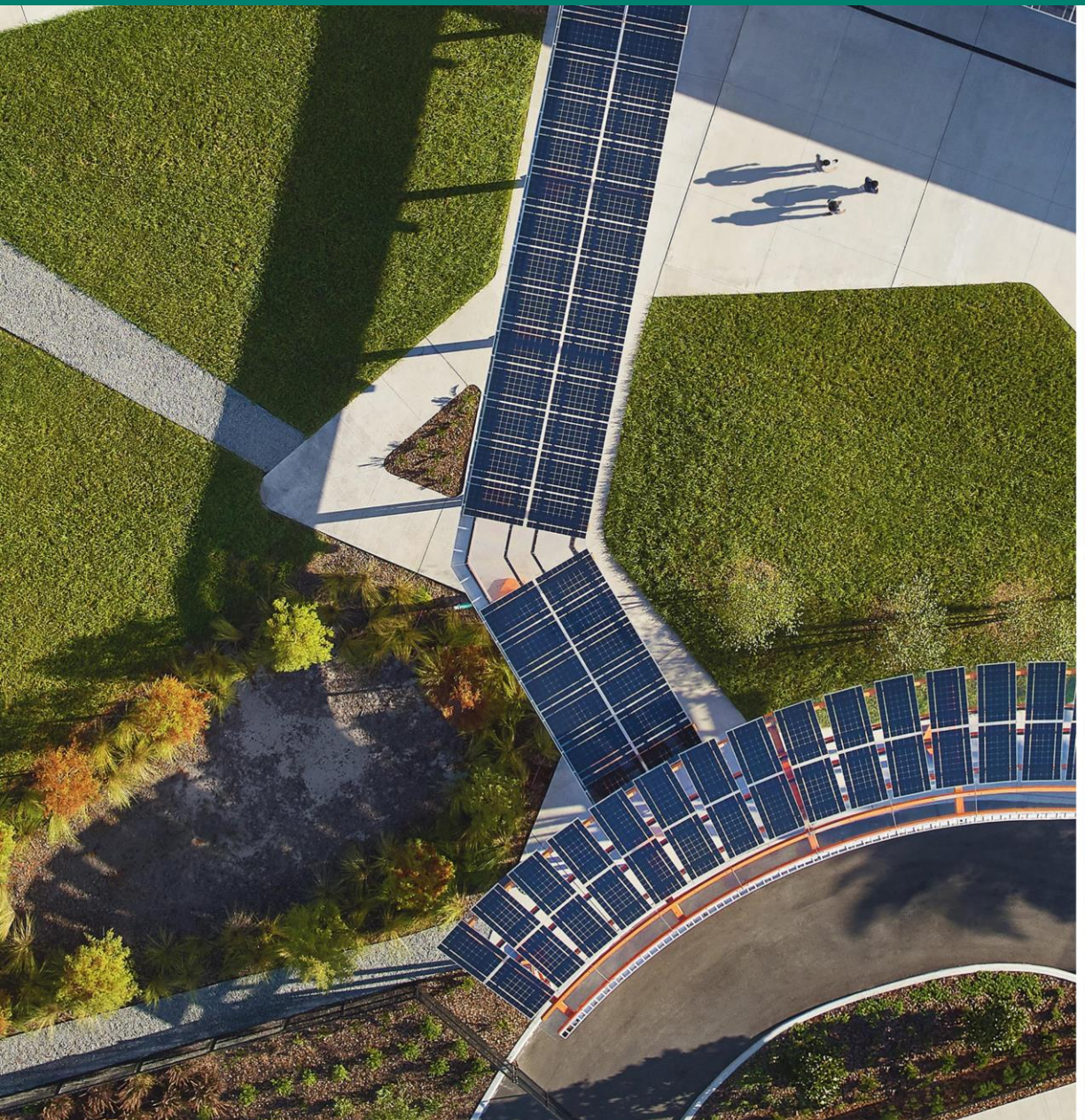
NEOCITY STEM ACADEMY

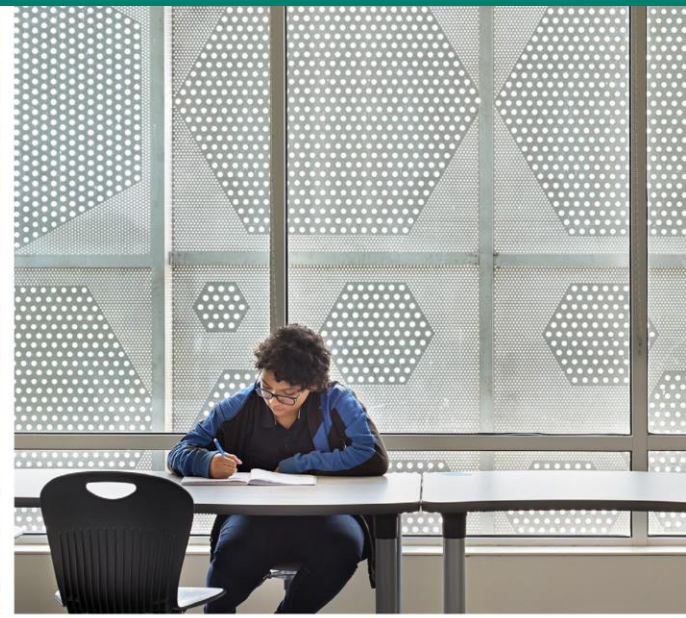
FLORIDA'S FIRST
ZERO ENERGY SCHOOL

FLORIDA'S FIRST
IMMERSIVE LEARNINGSCAPE

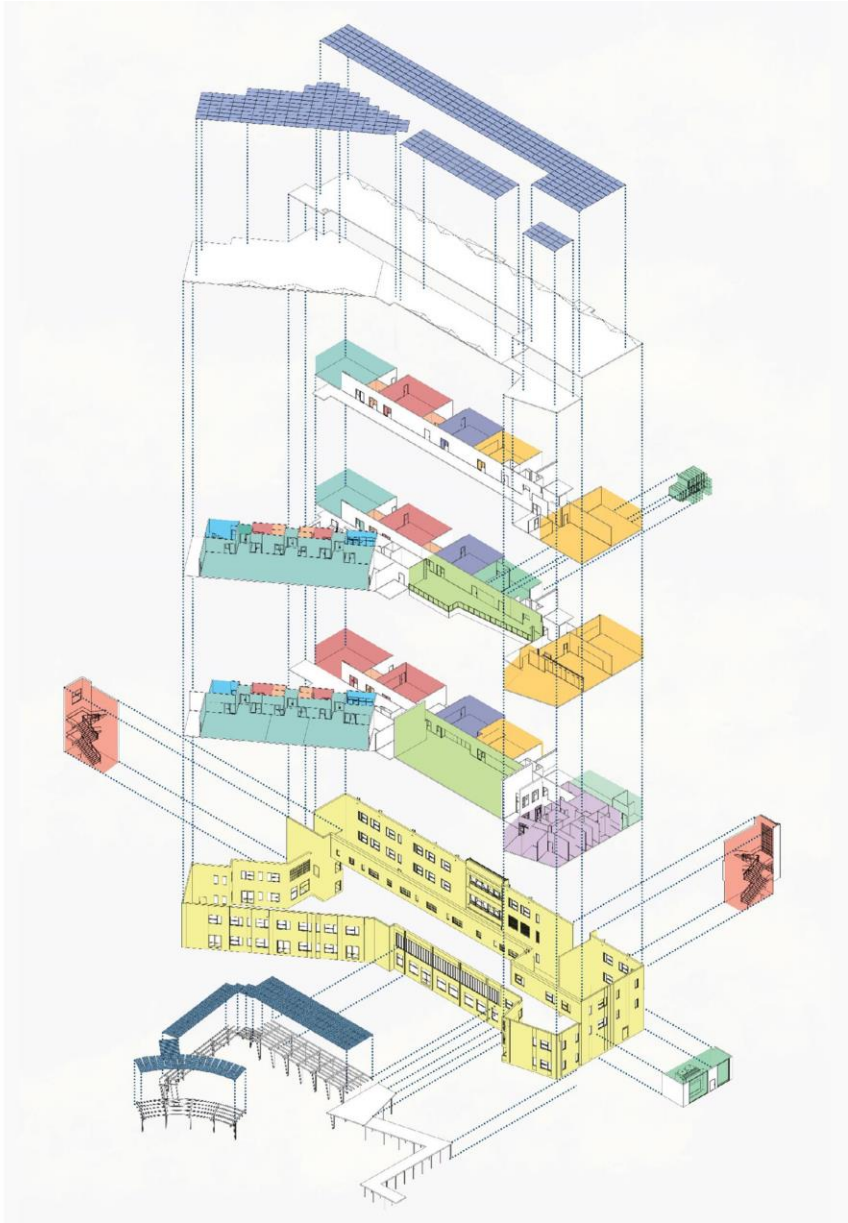

PHOTONICS
CIRCUITS
BIOMIMICRY
NANO-CARBON
NEOCITY ACADEMY
NEOCITY ACADEMY
CONCEPT - EXTERIOR

DAYLIGHT / ENERGY HARVESTING

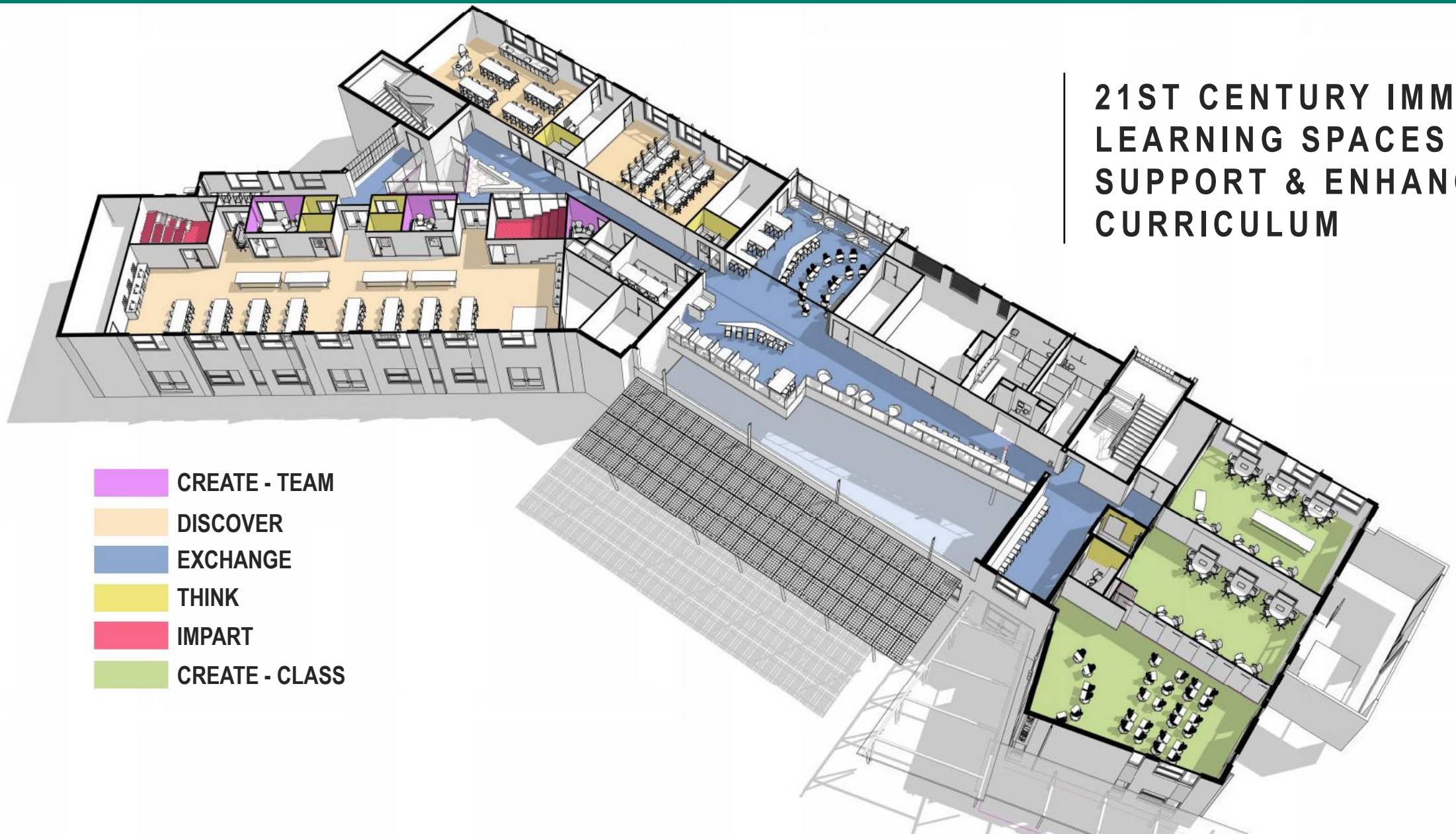




- administration
- circulation
- create lab
- demonstration lab
- fab lab
- flex lounge
- impart
- mixer
- science
- storage
- support
- teacher exchange
- team create
- think



21ST CENTURY IMMERSIVE LEARNING SPACES THAT SUPPORT & ENHANCE CURRICULUM



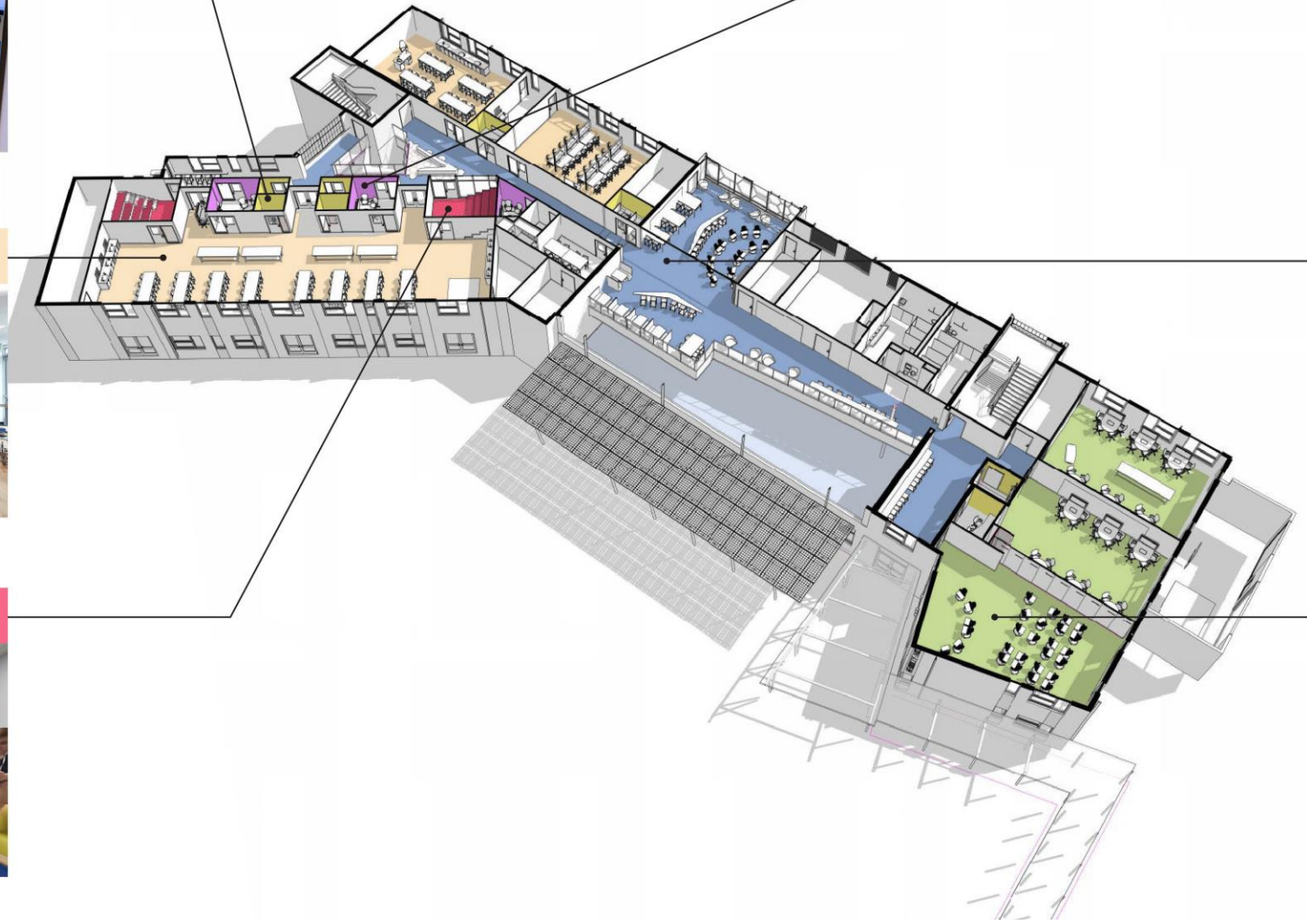
IMMERSIVE LEARNINGSCAPE

MASTERMOVE 4

THINK

DISCOVER

IMPART

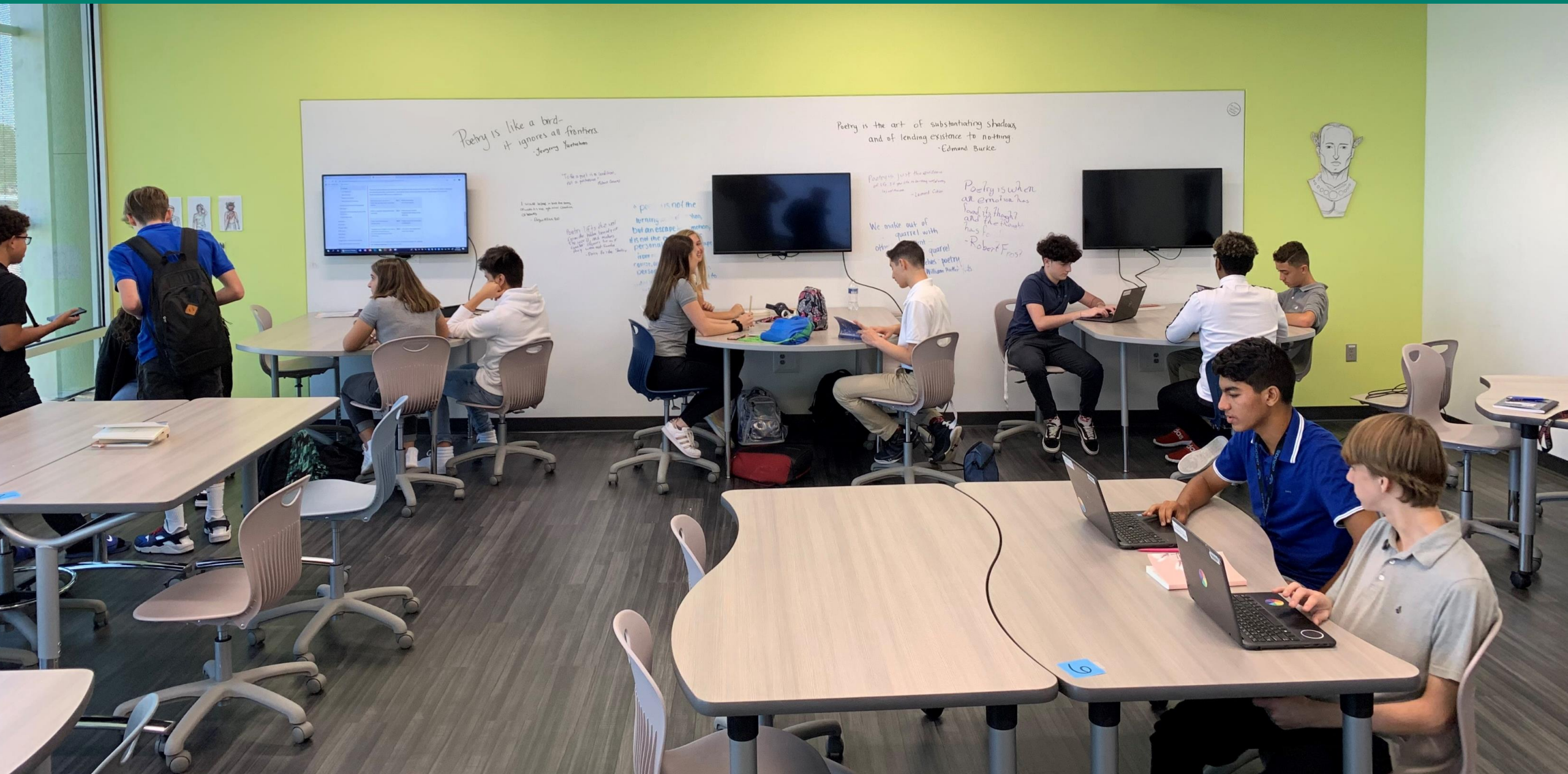


CREATE (TEAM)

EXCHANGE

CREATE (CLASS)


VEX Robotics Competition Tower Takeover: 2019 - 2020 VRC Game
VEX
'A' TEAM
Princesses
Kandace Battle
Yana Jiang
Reagan Highfield

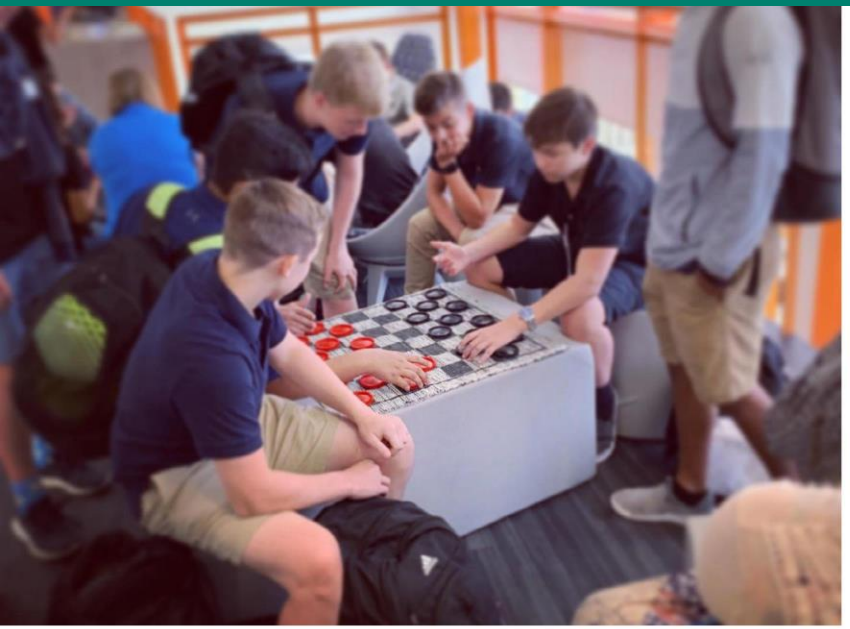

Poetry is like a bird-
it ignores all frontiers.
Poetry is the art of substantiating shadows
and of lending existance to nothing.
-Edmond Burke
Poetry is when
all emotion has
found its thought
and the thought
has found
-Robert Frost

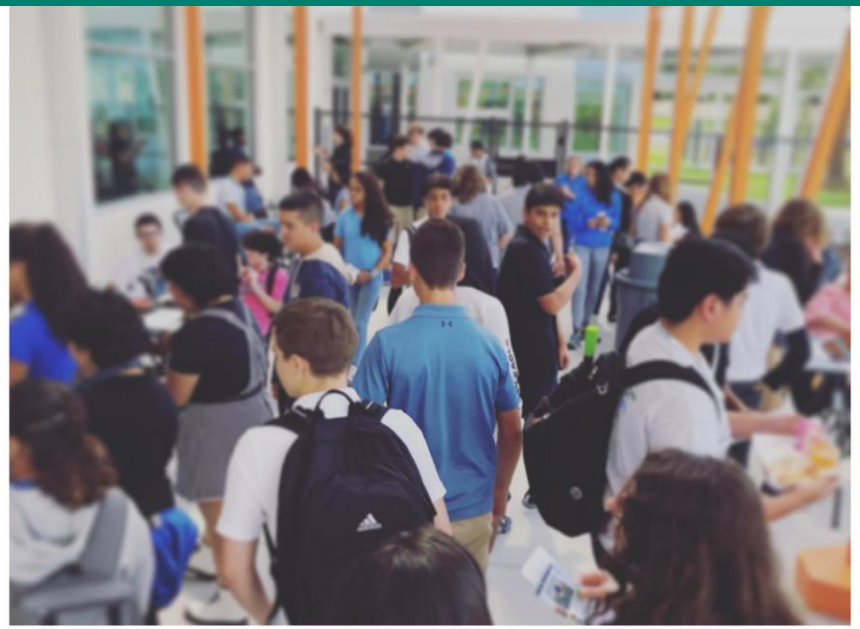
CREATE - TEAM

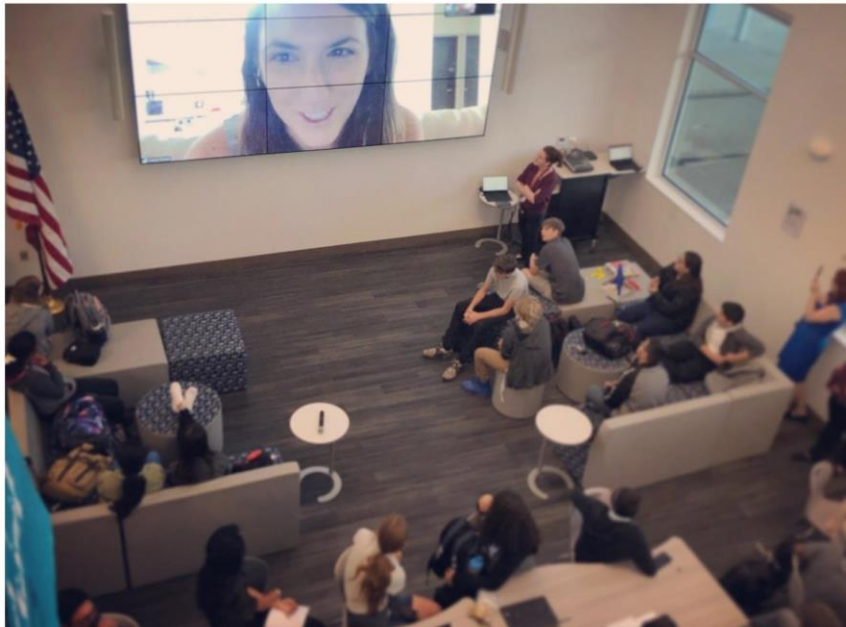
MASTERMOVE 4

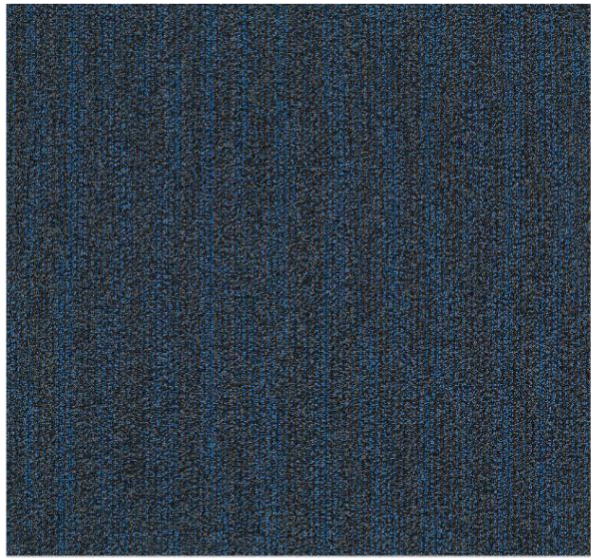

RIKON


and Gate
inverter gate
or gate
01-005
HALLWAY





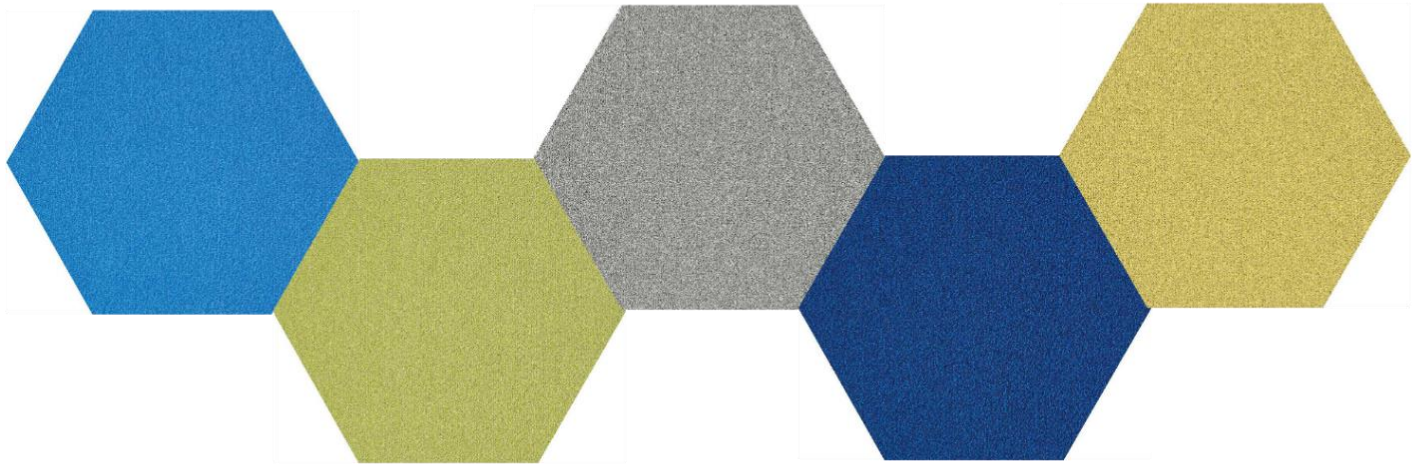




WALK-OFF MAT

VINYL FLOOR TILE

VINYL FLOOR TILE



ACCENT CARPET ACCENT CARPET ACCENT CARPET ACCENT CARPET ACCENT CARPET

ACCENT PAINT

ACCENT PAINT

GENERAL PAINT

ACCENT PAINT

MATERIAL PALETTE: PUBLIC SPACES

RESULTS

HIGH PERFORMANCE COST INFORMATION

Constructed within the state mandated guidelines for school facility costs

ON BUDGET & ON TIME!

$13.2M

FINAL CONSTRUCTION COST

($294 / sf or $26,400 / Student Station)

9.5 YRS

TIME TO REALIZE A RETURN ON INVESTMENT (9.3%)

44,560 SF

$593K

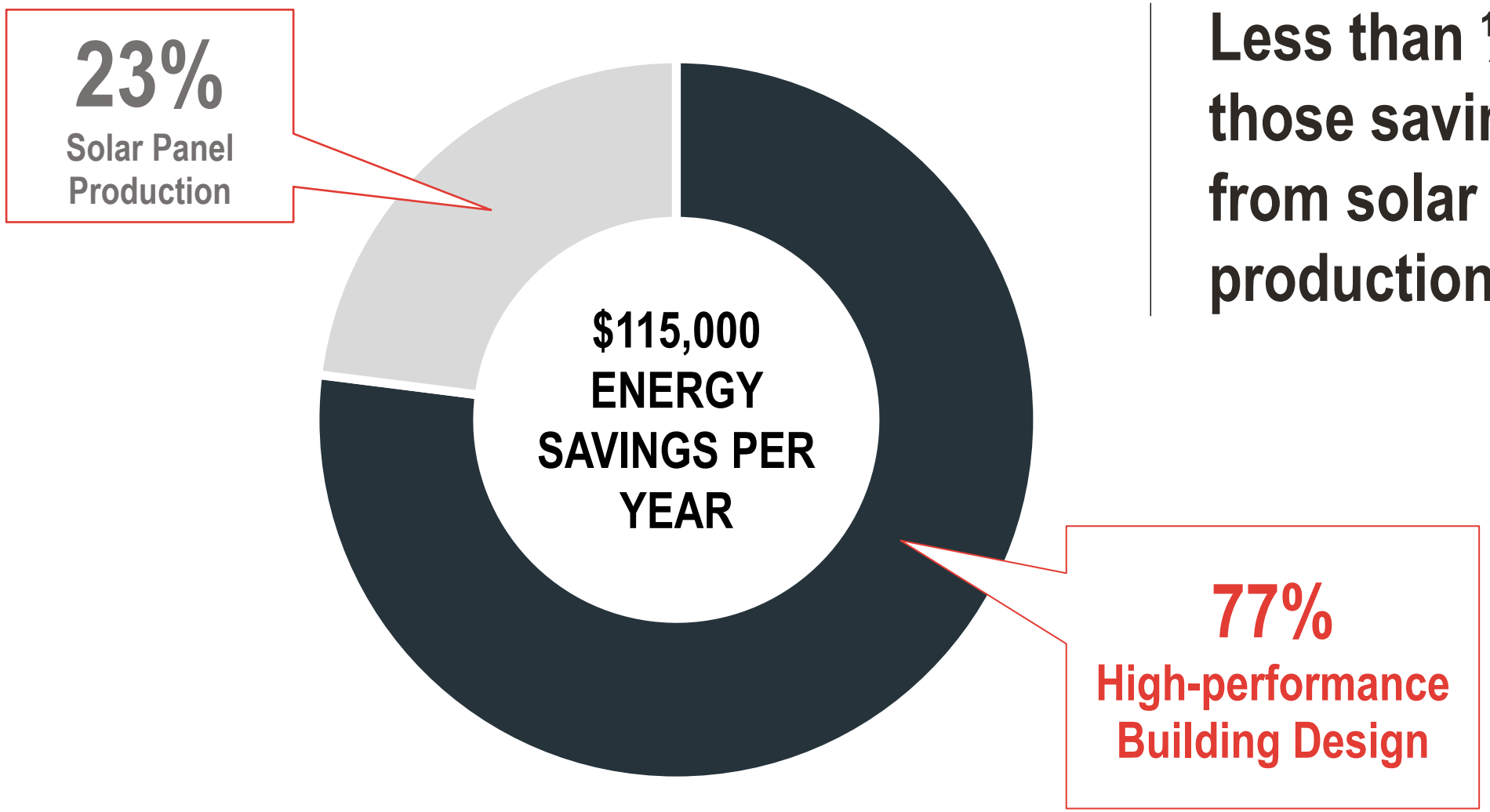
COSTS FOR IMPLEMENTING THE HIGH-PERFORMANCE FEATURES

ROI of 4.5 years (4.4%)

$515K

COST FOR FULL SOLAR ARRAY ON ROOF AND CANOPIES

ROI of 8 years total when combined with other High Performance Features (3.9%)



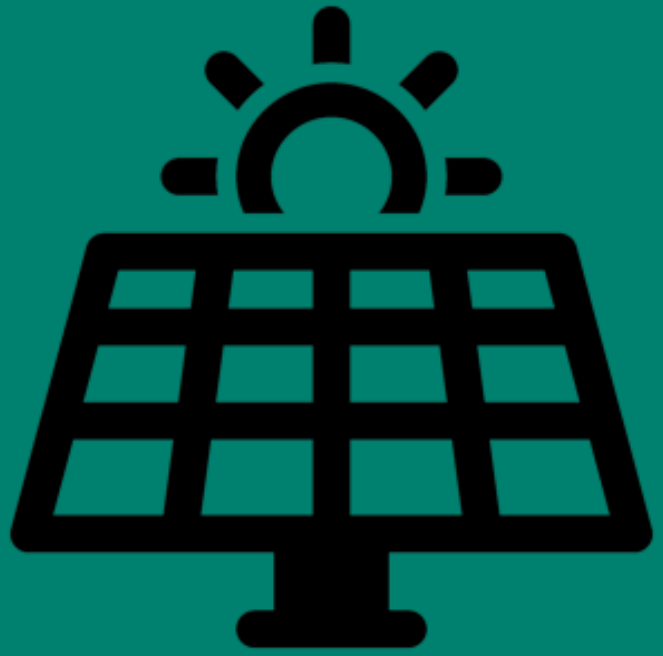
Less than ¼ of those savings are from solar panel production

SOLAR PANELS

TOTAL: 650

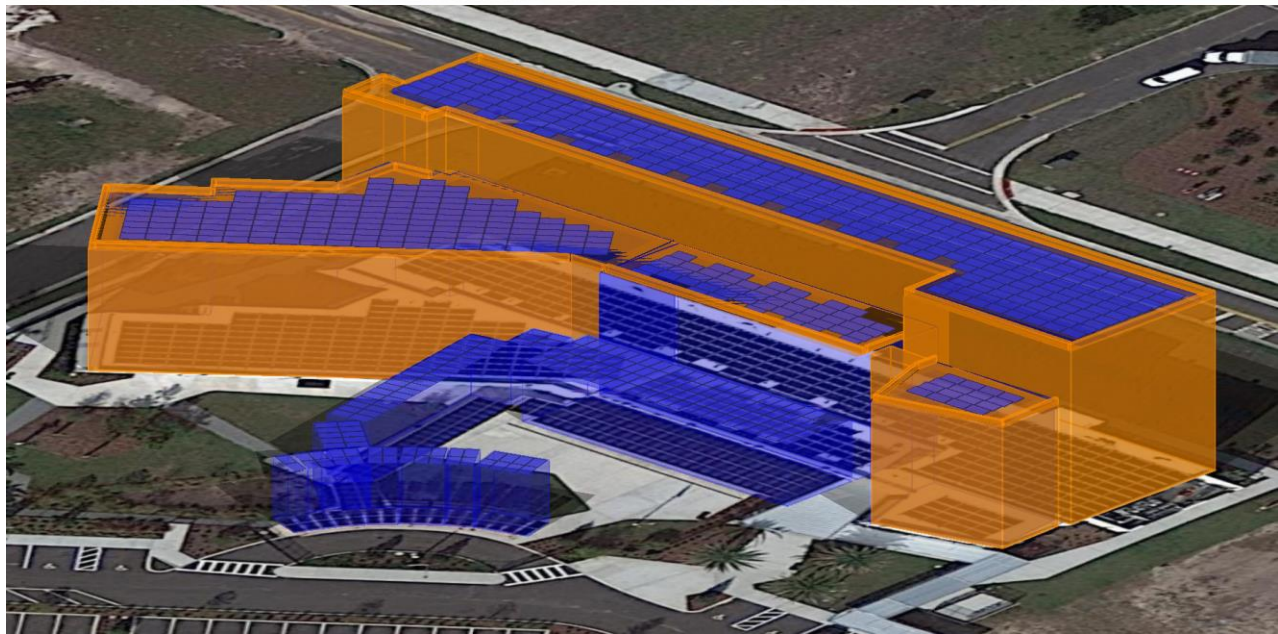
470 SELF-BALLASTED ROOF MOUNTED

180 CANOPY MOUNTED



228kW

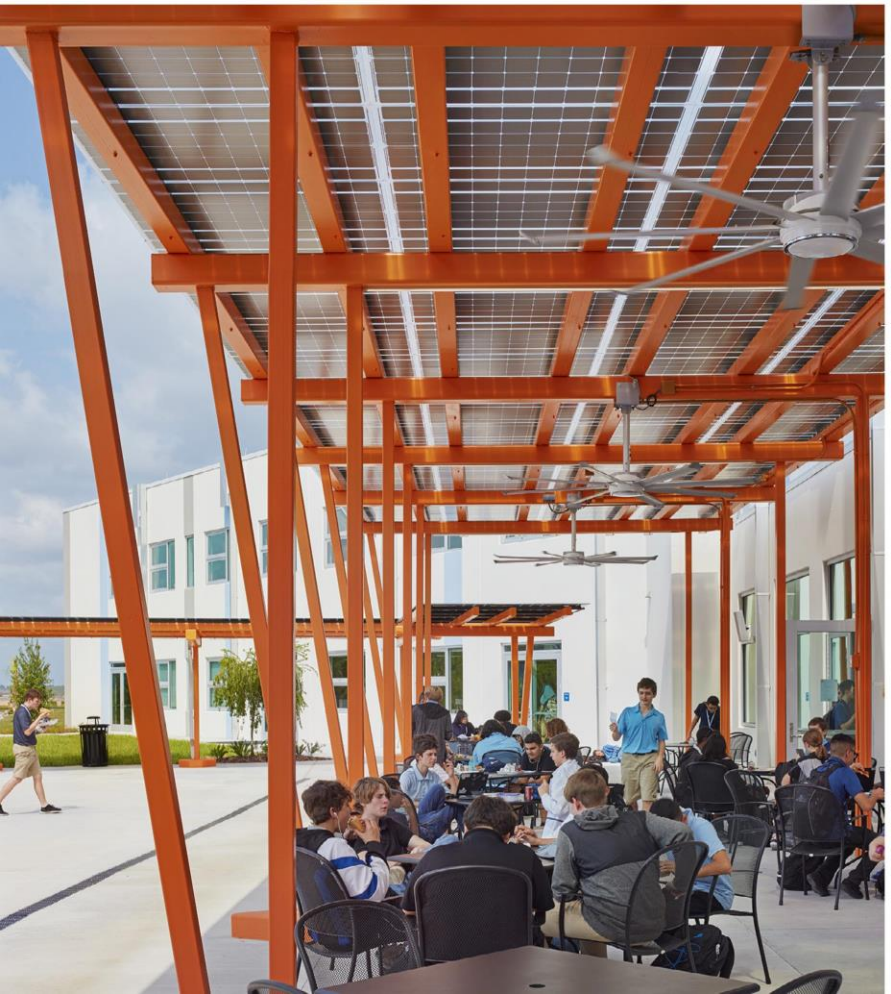
OF ENERGY PRODUCTION

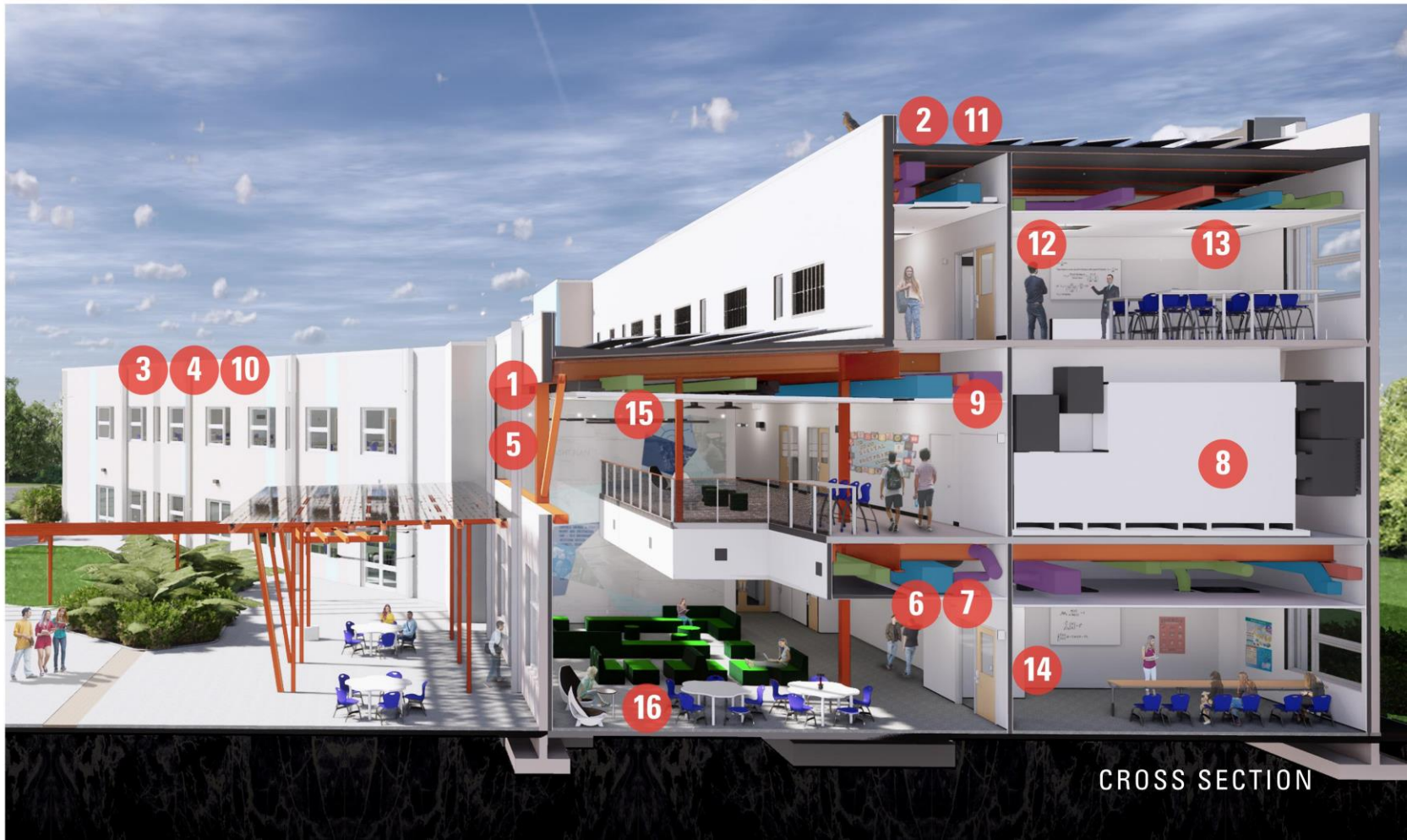


2030 CHALLENGE - DESIGN STRATEGIES

Results: Through a low-tech approach to the design of the exterior skin, exterior details, and simple mechanical systems, this high performing school utilizes 76% LESS energy than similar schools.

1. One of the Tightest Buildings in the World
2. No Roof Penetrations = Reduced heat transfer + Less leaks
3. Cost-Effective + High Performing Skin. The tilt-wall concrete panels serve as the best air and water barrier
4. High Albedo Walls. The panels are coated with a high-performance paint on the exterior that helps to further reflect solar radiation
5. Energy-Efficient Glazing Daylight Harvesting
6. Small, Nimble and Efficient HVAC system
7. High Performing HVAC
8. DOAS – Decoupled System of Fresh Air from Cooling System
9. Captured Condensate Water
10. Low Maintenance Design
11. Smart, Optimized Passive Roof Construction
12. Sensors and BAS System
13. All LED lighting
14. Energy Metering
15. Building as a teaching tool
16. WELL Inspired





CROSS SECTION

LIFECYCLE COSTS
(VS TYPICAL SCHOOL BUILDING)

$115K

SAVED PER YEAR ON ENERGY COSTS

$3.2M

SAVED OVER 20 YRS ON ENERGY & MAINTENANCE COSTS

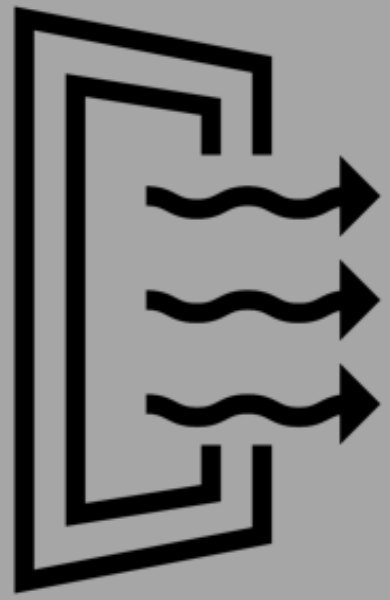
44,560 SF

500

STUDENTS
(CAPACITY IS 625)

WITHIN COST PER STUDENT STATION & SREF

WHOLE BUILDING AIR LEAKAGE
AREA OF ENVELOPE: 73,286 SF



10,993 CFM

.15 cfm (at 75 Pascals)

REQUIRED RATE

WHOLE BUILDING AIR LEAKAGE
AREA OF ENVELOPE: 73,286 SF

1,970 CFM

.027 cfm (at 75 Pascals)

TESTED RATE

HIGH PERFORMANCE BUILDING PREMIUM

+ 5.5%

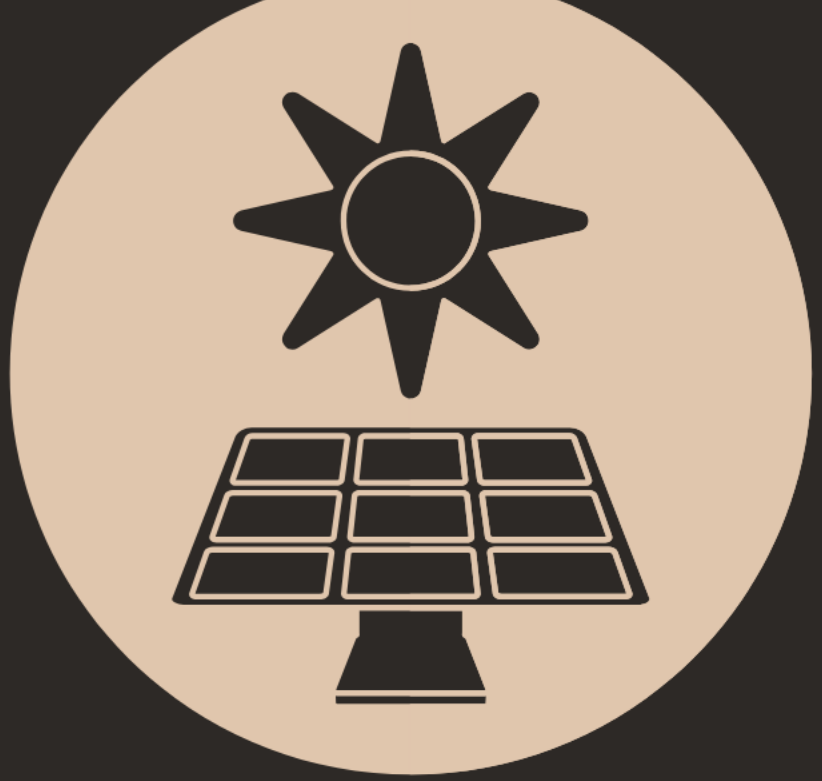
PREDICTED ROI = 6 YEARS

FULL ZERO-ENERGY BUILDING PREMIUM

+ 9.3%

PREDICTED ROI = 9.5 YEARS

MEANINGFUL, SUSTAINABLE AND INTEGRATED DESIGN STRATEGIES THAT ENHANCE HUMAN HEALTH, ENERGY EFFICIENCY, AND ENVIRONMENTAL STEWARDSHIP



LET'S TALK ABOUT YOU


Q&A

THANK YOU!

TOMAS ELIAESON
AIA, LEED AP

DESIGN PRINCIPAL
Little Diversified Architectural Consulting

TRACY STEWARD
MBA, WELL AP

PRINCIPAL
CMTA Engineering

SEAN TRACY
AIA

PRINCIPAL
Little Diversified Architectural Consulting

This concludes The American Institute of Architects Continuing Education Systems Course

Tomas Eliaeson, AIA, LEED AP
Sean Tracy, AIA
Tracy Steward LEED AP, WELL AP

CMTA

LITTLE
DIVERSIFIED ARCHITECTURAL CONSULTING

CONTINUING EDUCATION AIA