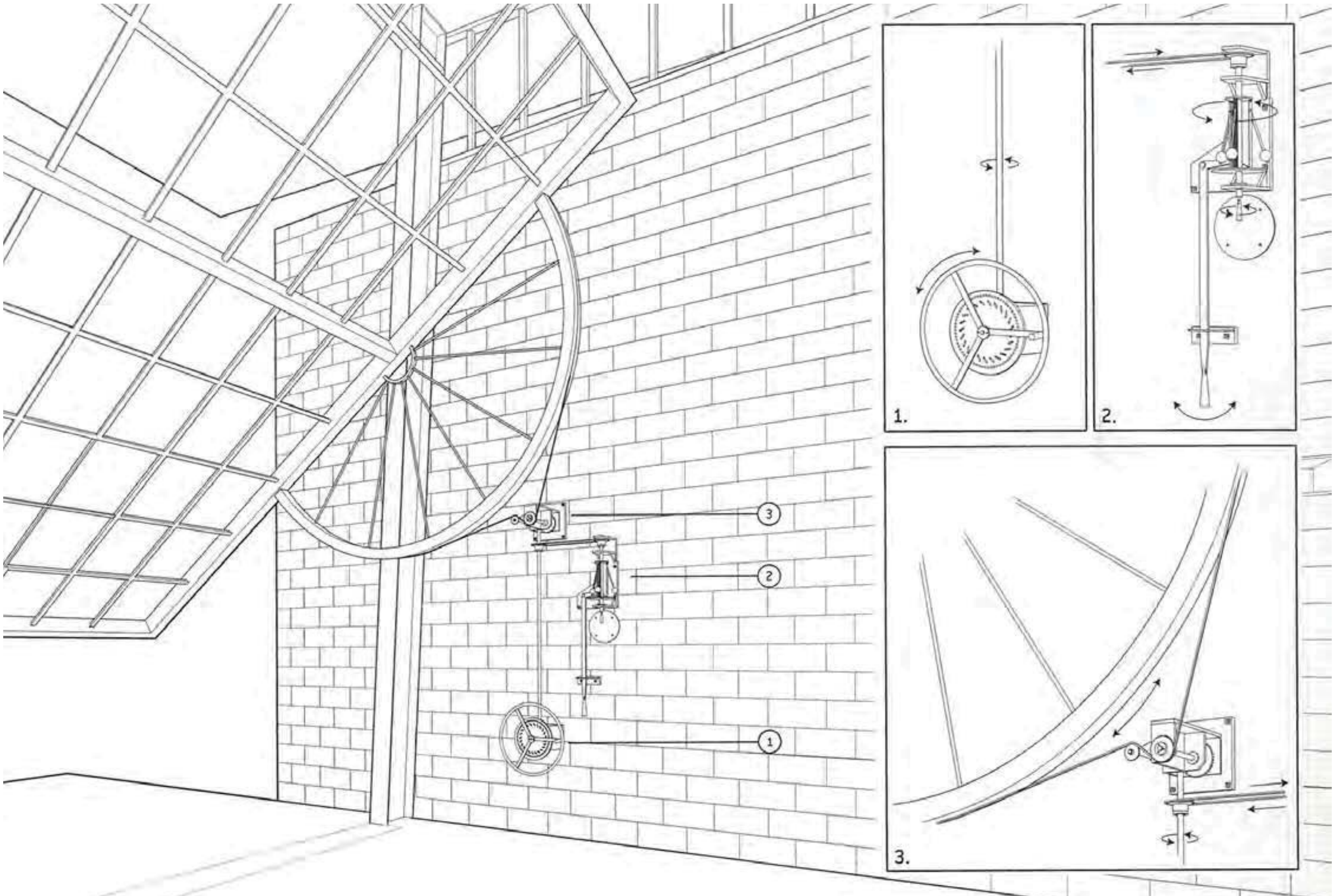
Spring 2014

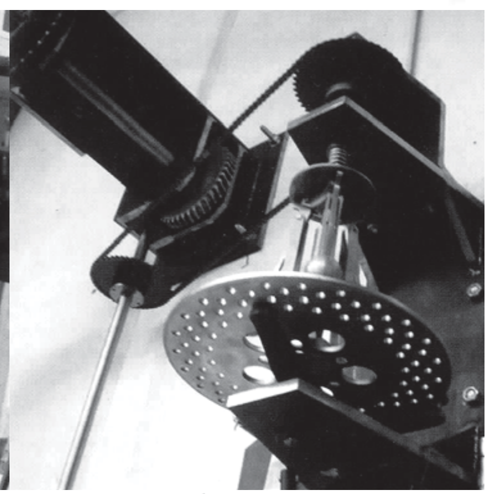
Epistemology: It’s Elementary! An Architectonically Constructivist Elementary School in Syracuse, NY-- Part 2

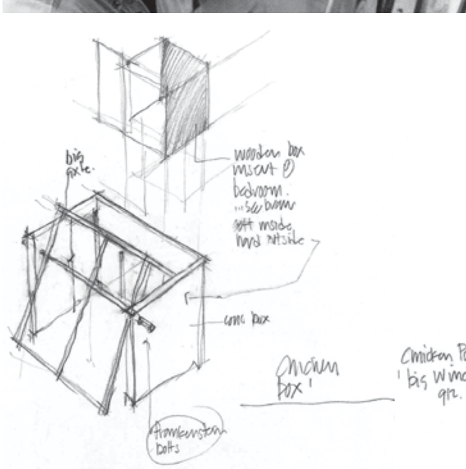
Tyler Ferrusi

Figure 117: The gadget can be operated by the client's own son; gear ratios make this possible.

Figure 118: Detail of the gear mechanism, flyball governor, and the steel plate ringer that hangs below it.







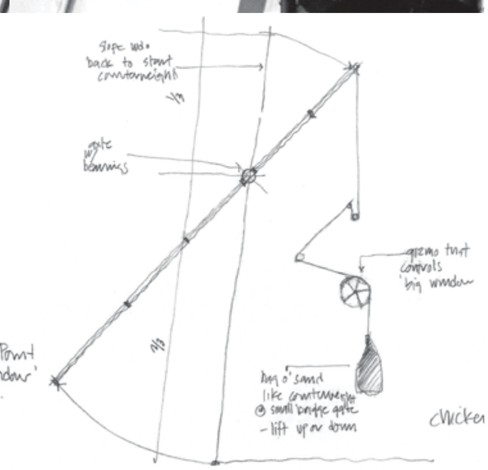


Figure 119 (Top): Drawing of the Gizmo. Though the bottom portion of the door is larger, its weight is equal to that of the top half, producing a state of equilibrium that requires less force to pivot. The wheel (1) turns the driveshaft (3). The flyball governor (2) regulates the speed of the gears for safety by spinning in the opposite direction, activating a pendulum which sounds the flat disc under it as a warning.

Figures 120-121 (Middle Left): Kundig worked with Phill Turner to test and engineer the Gizmo.

Figures 122-123 (Bottom Left): Kundig's preliminary skeches for the door.

Figure 124: Detail of the Gizmo.

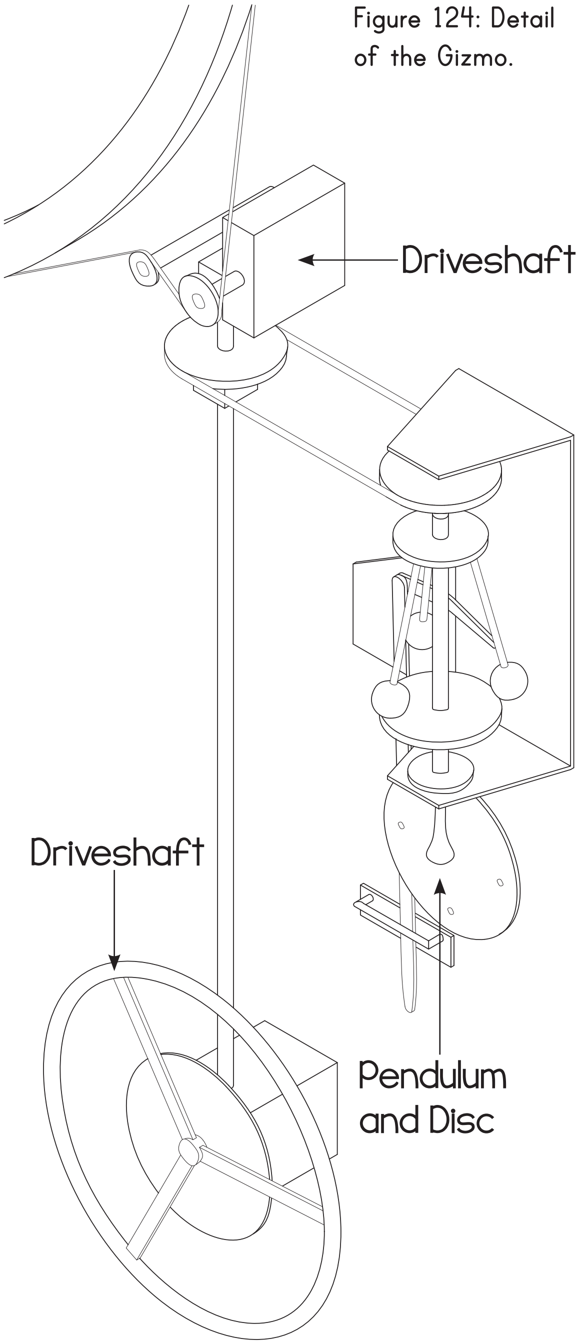


Figure 125: Detail of the large swinging door.

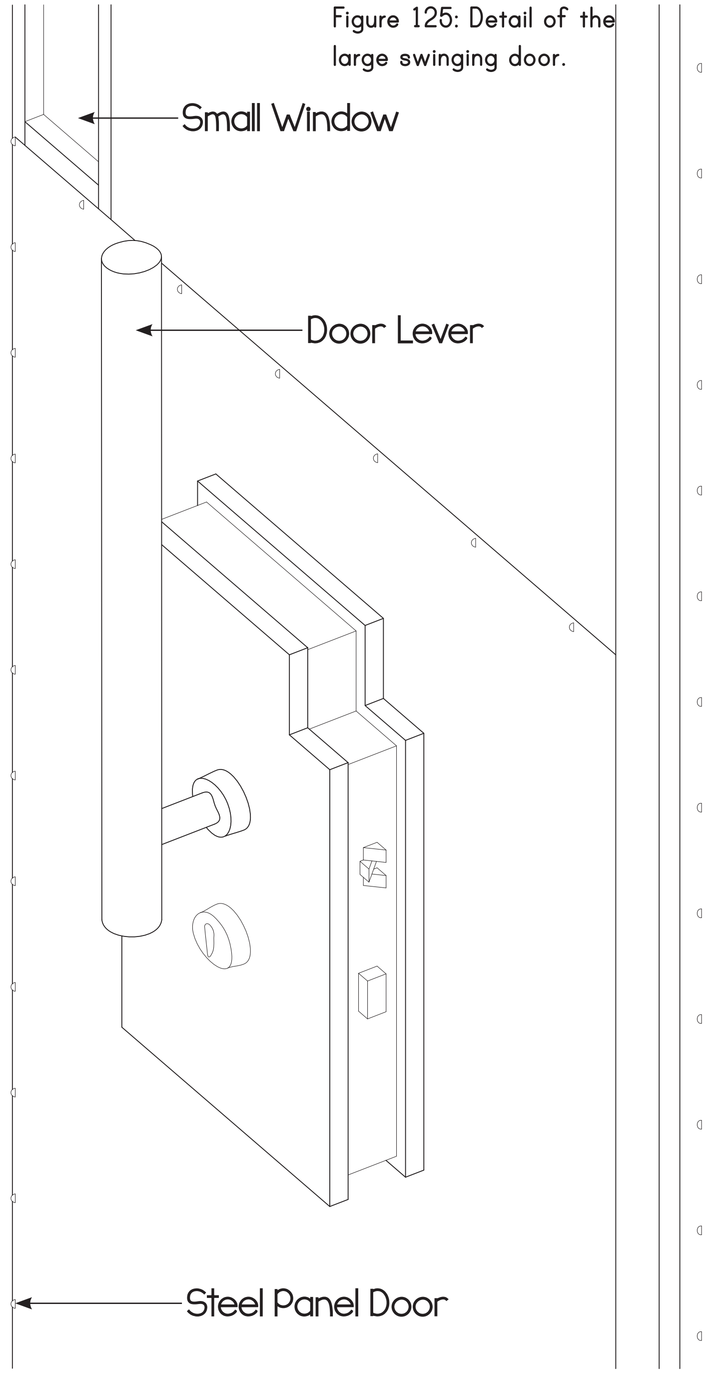
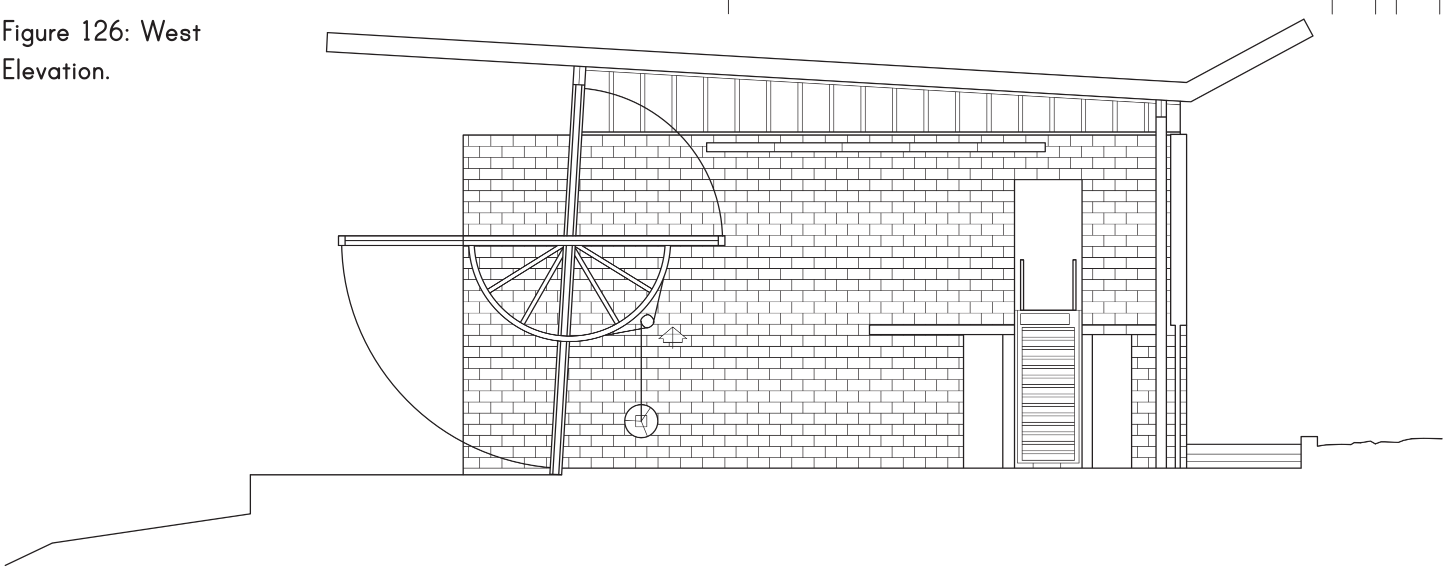


Figure 126: West Elevation.



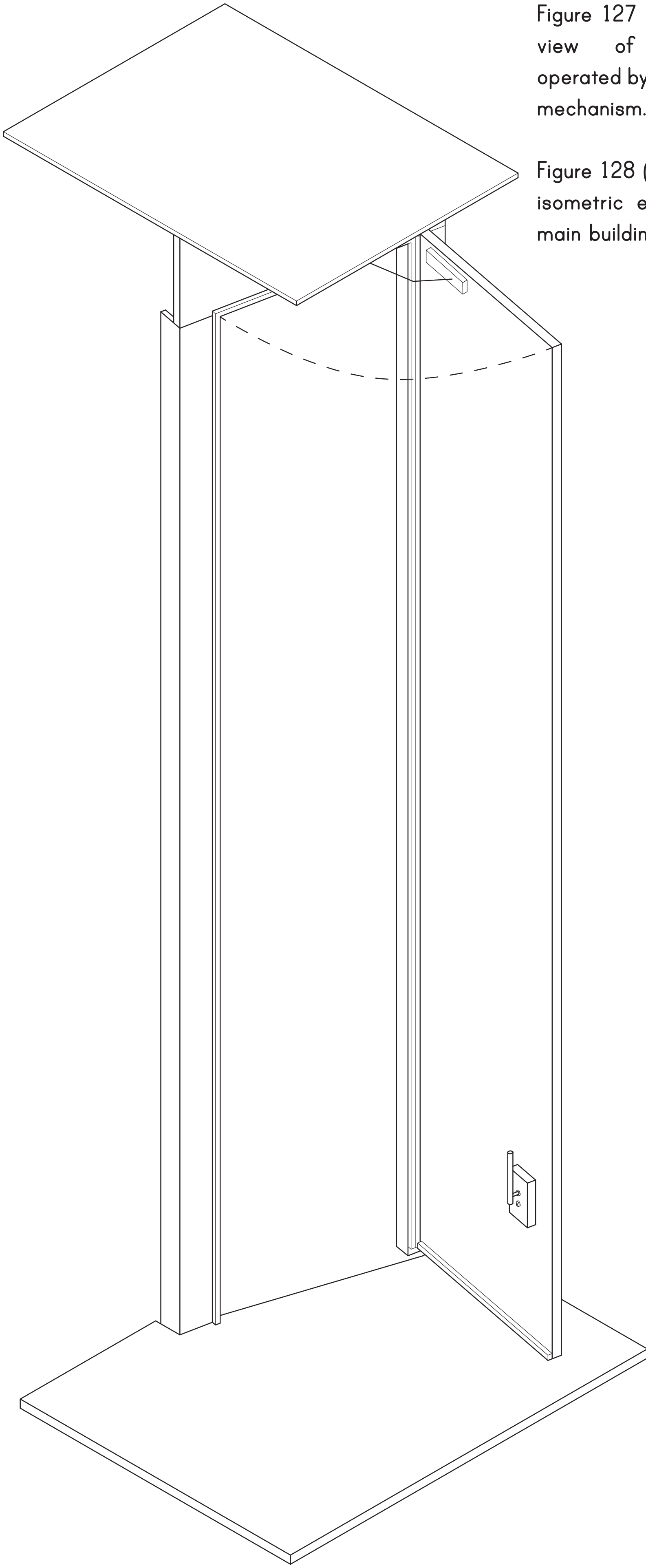
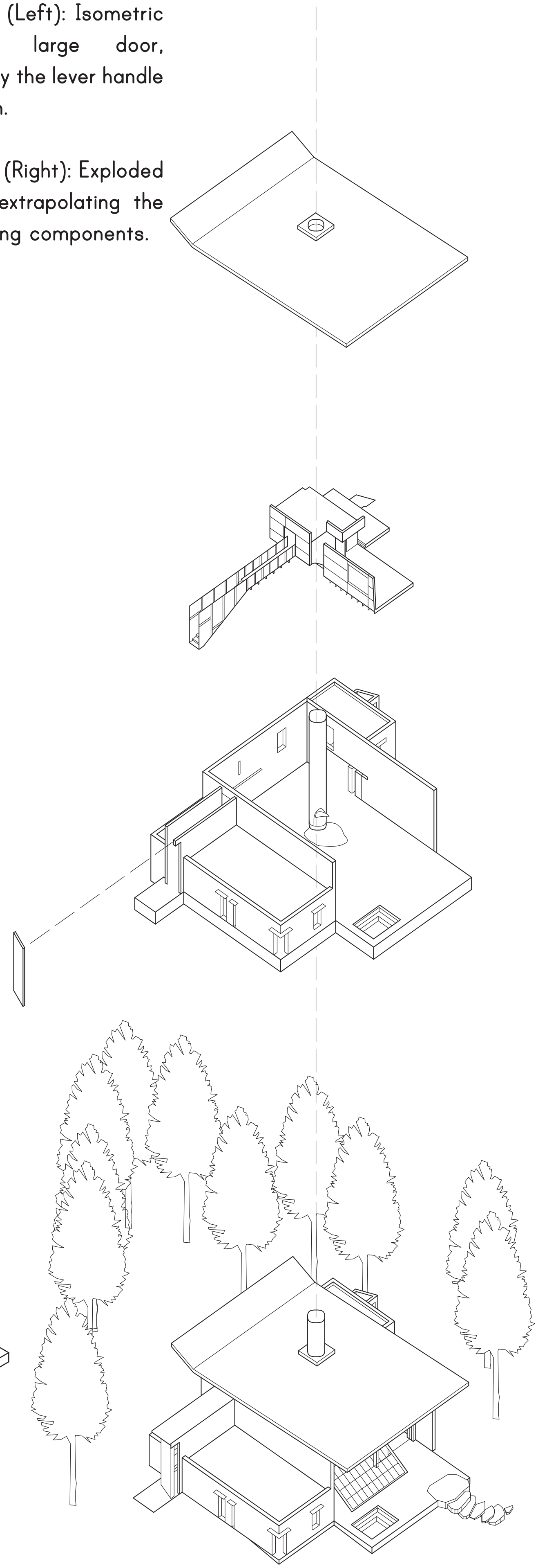
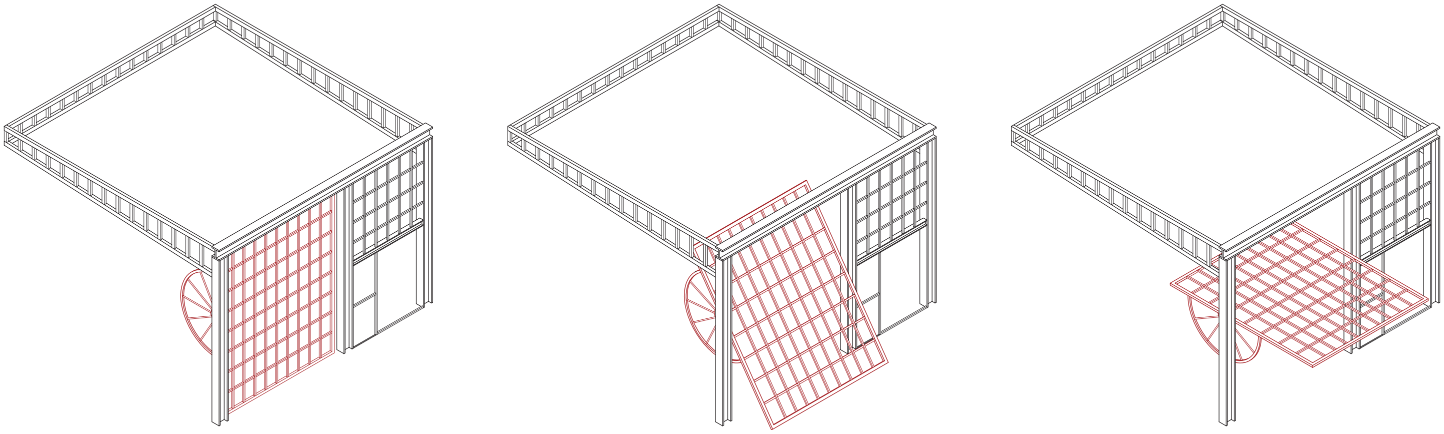


Figure 127 (Left): Isometric view of large door, operated by the lever handle mechanism.

Figure 128 (Right): Exploded isometric extrapolating the main building components.





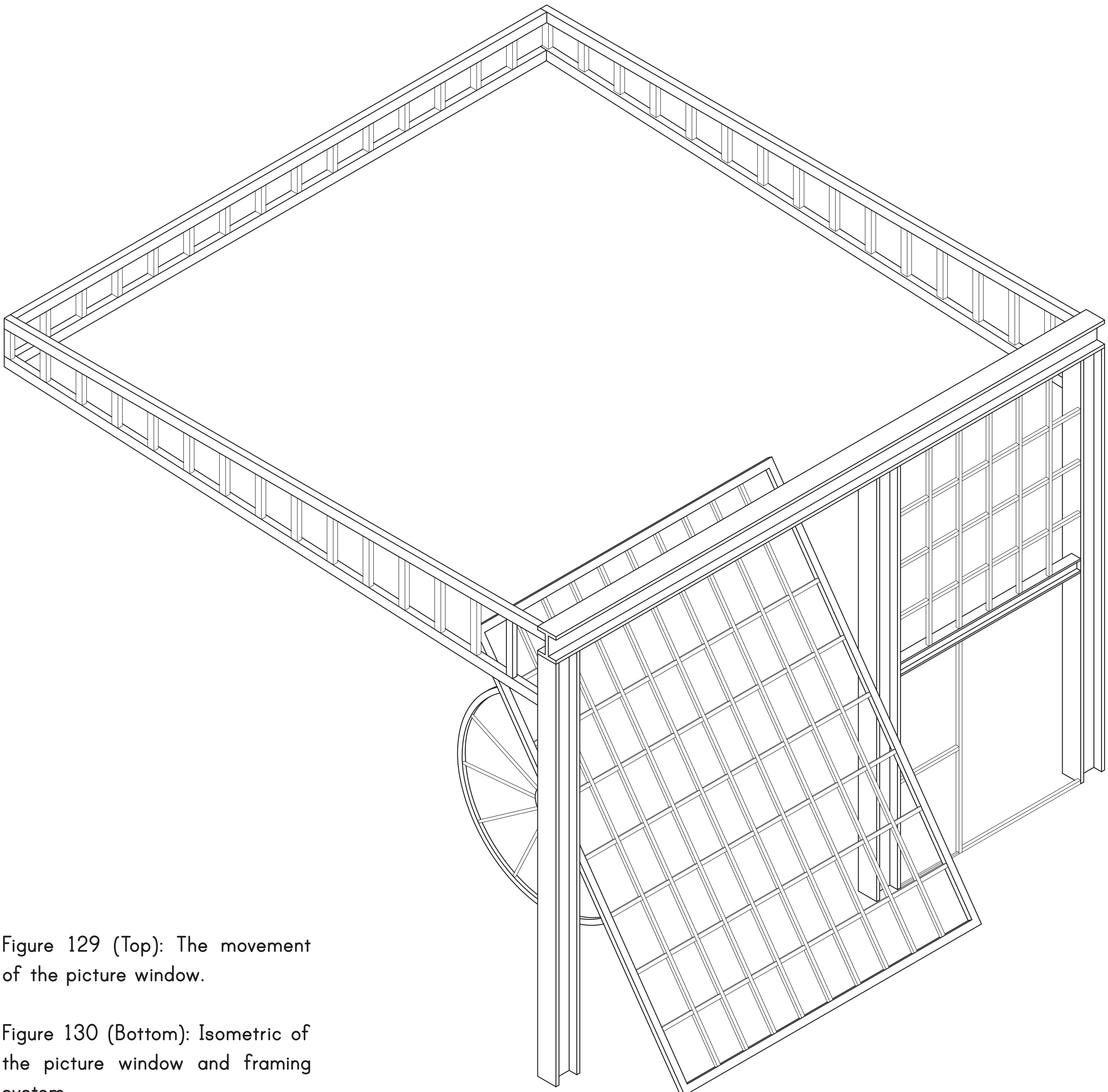


Figure 129 (Top): The movement of the picture window.

Figure 130 (Bottom): Isometric of the picture window and framing system.

The Learning Environment

Learning Environment Components
The Normative and the New

Traditional


Figure 131

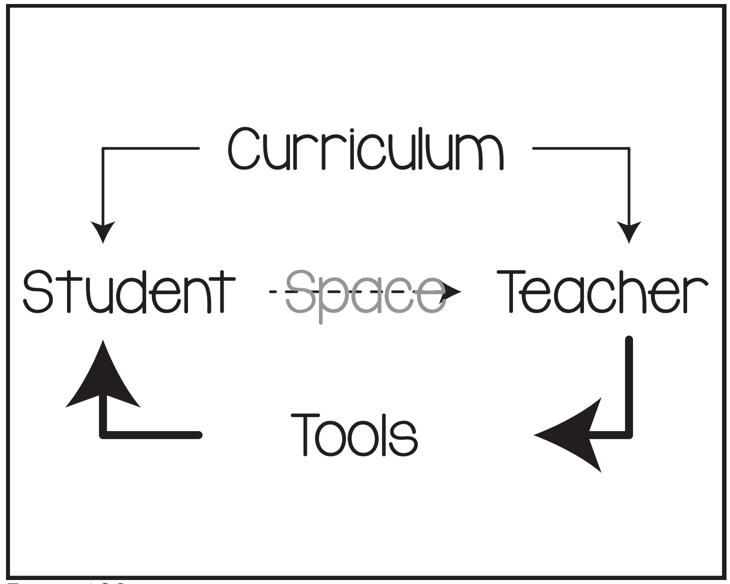


Figure 132

In a traditional learning environment, a rigid curriculum governs the relationship of the teacher and the students. Knowledge comes directly from the teacher who occasionally uses tools to demonstrate and reinforce concepts. Space is only a physical requirement of this process.

Constructivist

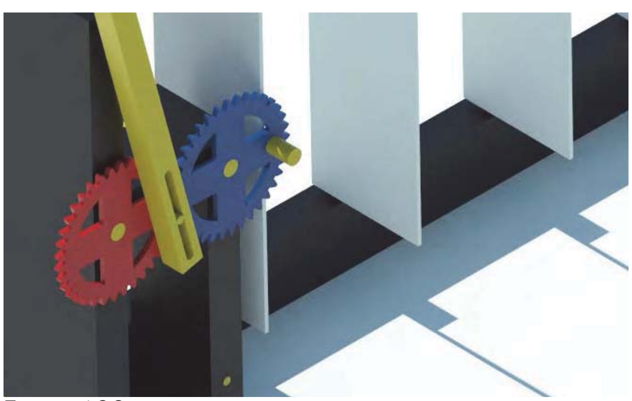


Figure 133

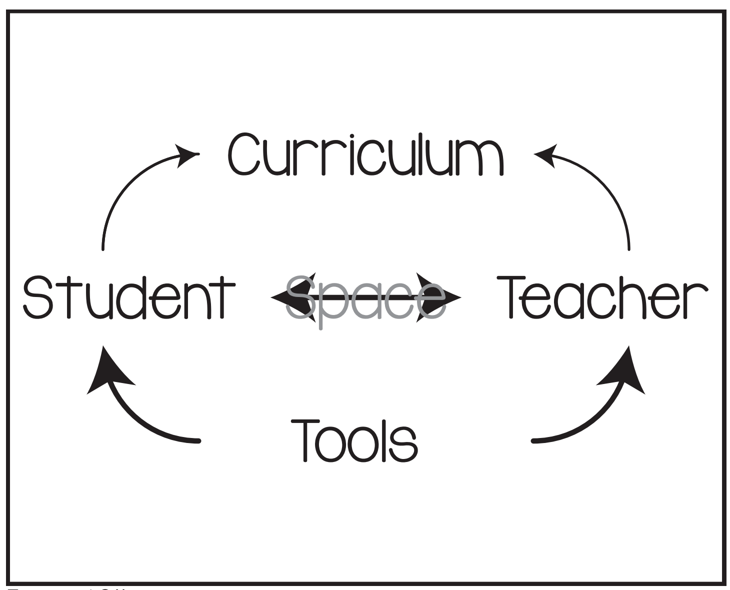


Figure 134

In a Constructivist learning environment, an adaptable curriculum affects both the teacher and the students. Knowledge comes about equally from the teacher and the tools used to discover and investigate concepts. The space has a multitude of effects on the student who utilizes the space as a collection of tools.

Montessori

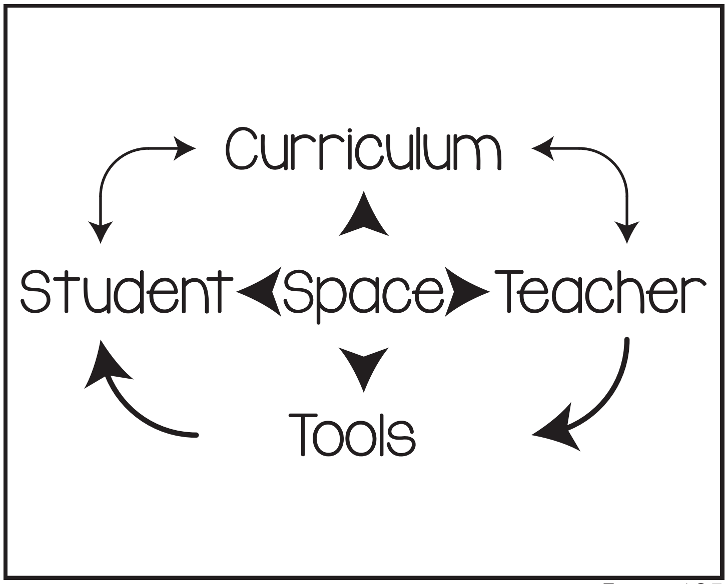


Figure 135

Figure 136

In a Montessori learning environment, a rigid curriculum governs the relationship of the teacher and the students. Knowledge comes primarily from tools used to demonstrate concepts with restrained interaction by the teacher. The space allows for a relatively restrained level of direct interaction between the teachers and students to promote constructivist learning.

Reggio Emilia

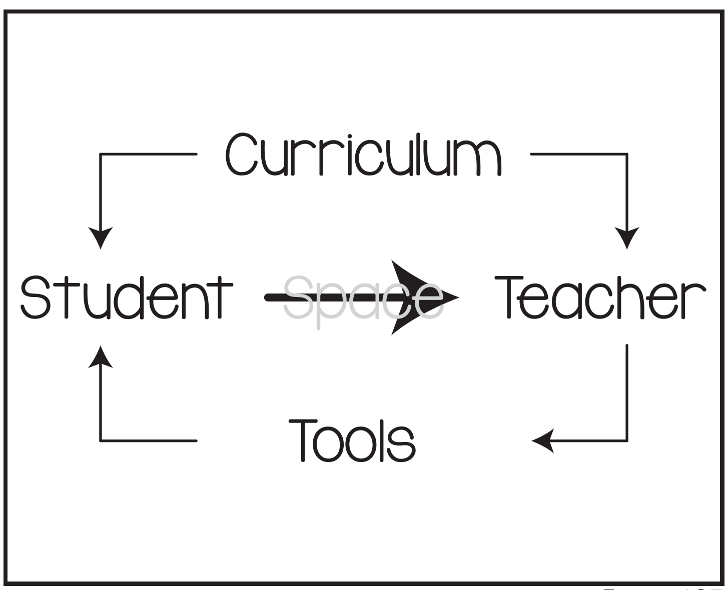


Figure 137

Figure 138

In a Reggio Emilia learning environment, an adaptable curriculum affects both the teacher the and the students. Knowledge comes equally from the teachers and the tools used to discover and reinforce concepts. The space has a primarily behavioral effect on the students, allowing for concentration through privacy.

Learning Environment Spaces
Workspace, perspective, and layout

Traditional

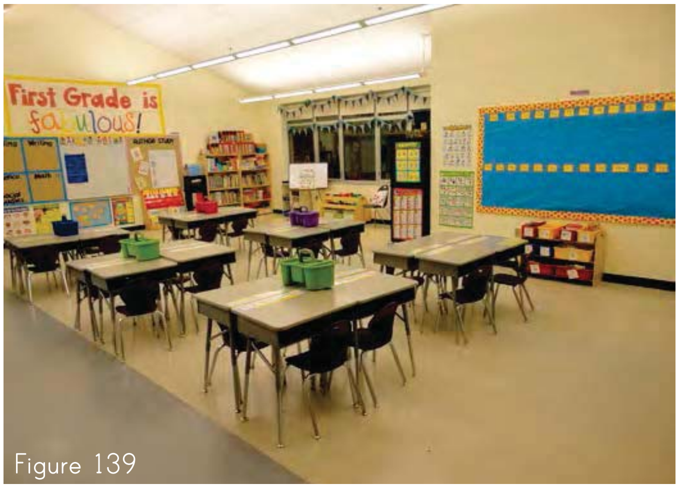


Figure 139

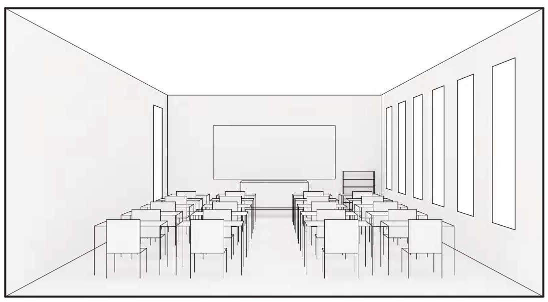
Montessori

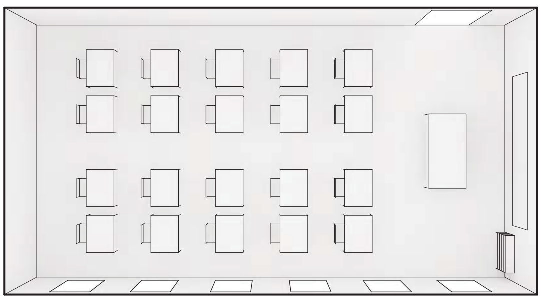
Figure 140

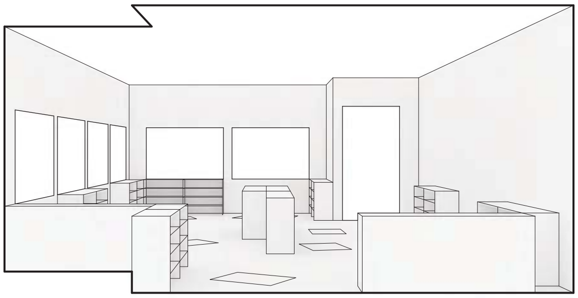
Reggio Emilia

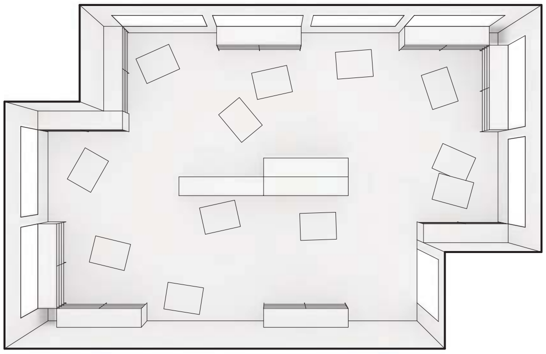
Figure 141

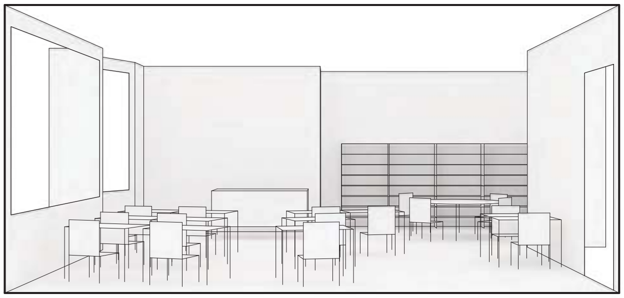
Figure 142

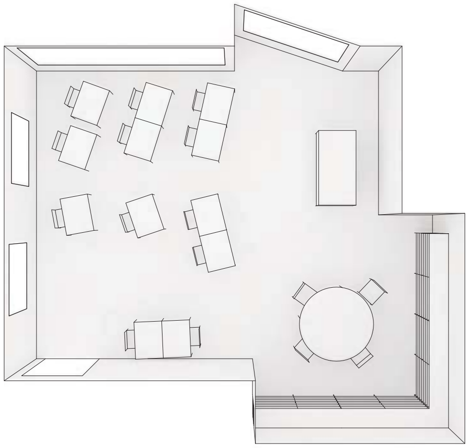












1/4" = 1'

1/128" = 1'

Human Factors

The conception of ergonomics is attributed largely to the Polish biologist Wojciech Jastrzebowski, who first coined the word in his 1857 article *The Outline of Ergonomics, i.e. Science of Work, Based on the Truths Taken from the Natural Science*. Ergonomics later entered the English language and was further developed by the British psychologist Hywel Murrell in 1949 to identify musculoskeletal stress in Navy men.[132] Ergonomics was then employed as a method of increasing efficiency and profit. Through ergonomics based studies, Frederic Winslow Taylor developed a 'scientific management' system which sought to maximize efficiency in such instances as tripling the weight of coal or brick one man could move in a given time.[133]

Although the field of ergonomics technically pertains specifically to labor (the roots coming from the Greek for 'work' and 'natural laws,'), the International Standards Organization defines ergonomics to be synonymous with 'human factors.'[134] 'Human factors' is a broader phrase which refers to the tailoring of equipment to suit the physical and cognitive properties of the human body and mind to capitalize on optimum health, safety, and productivity. Human factors therefore involve not only biometrics, but also physiology, psychology, architecture, engineering, industrial design, graphic design, operations research, and anthropometry.[135]

Some human factors standards are outlined by the Occupational Safety and Health Administration and by the International Ergonomics Association. These, however, do not clearly define or enforce codes for minimum and maximum angles, spacing, or heights for furniture design in the same way that there are for architectural design. Human factors for students are therefore determined at large by the mass produced products of industrial design purchased to occupy architectural space. Such furniture has come a long way since the bulky wood and iron desks of early schools.[136] Instead of just scaling down furniture optimized for use by adults, furniture for younger people is being re-proportioned to improve health and performance.

Figure 143 (left) Kindergarten Classsroom; Figure 144 (right) Elementary Classroom.
Dr. Weeks Elementary, a newly renovated school in Syracuse, NY exhibits newer furniture. Note the various size, flexibility, lightweight construction, and adjustability of the table and chair pieces.

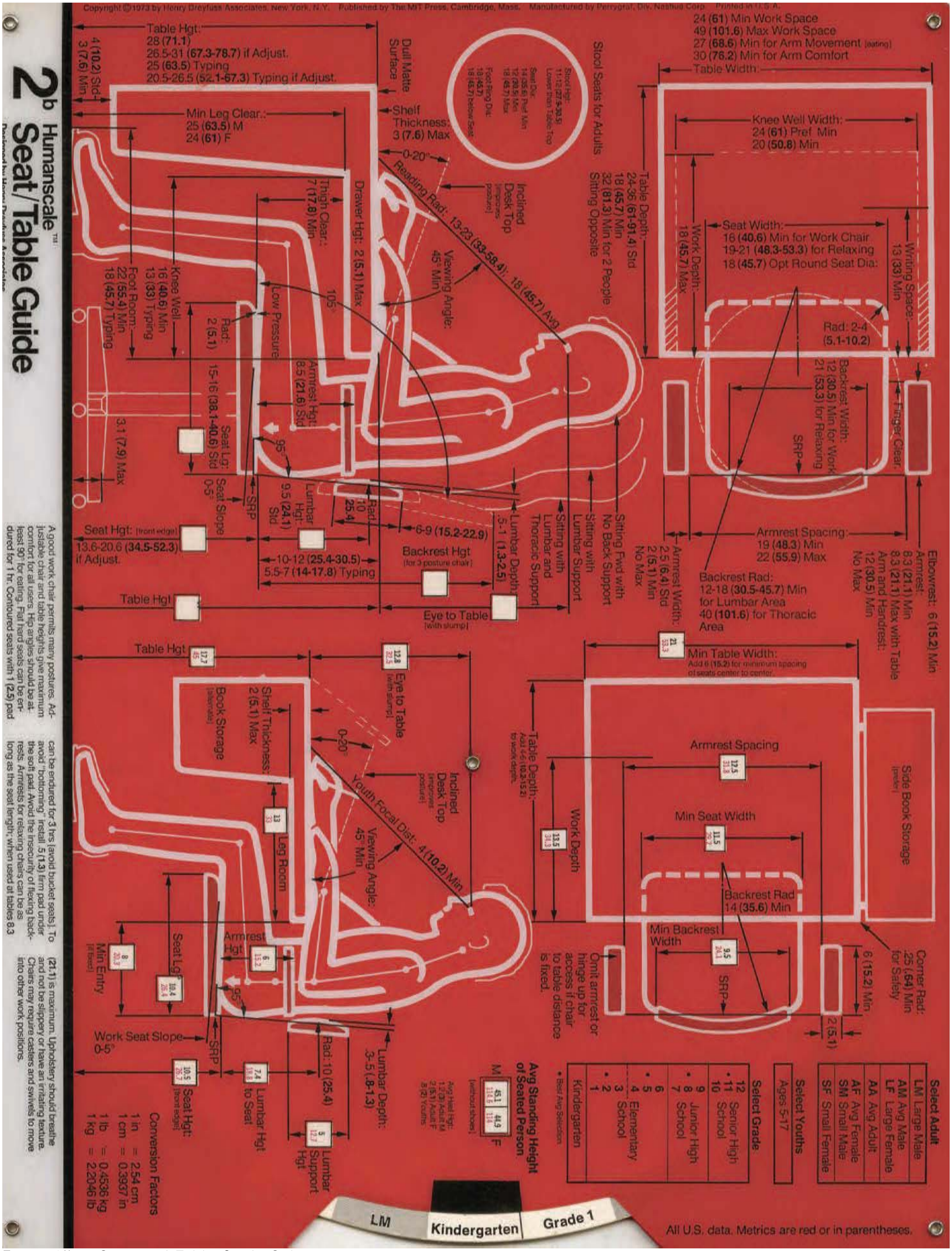


Figure 145: Seat and Table Guide Selector.

Sensory Stimuli

Specific to architecture, it is important to consider every design decision for its sensory stimuli properties not only for health, but also as a way to evoke thought and establish teachable moments for the construction of knowledge.

The Modes of Human Perception:

Feel Physical Contact:
Environmental (Passive) air movement and temperature radiation, humidity, and pressure
Haptic (Active) surface movement, temperature, and tension, shape (texture and contour)

See Visual Perception:
Shape, size, color, shade, shadow, and motion

Hear Aural Perception:
Volume, pitch, tempo and localization

Smell Olfactory Perception
Aroma

Taste Gustatory Perception
Texture, viscosity, flavor

Kinesthetic Perception (Proprioception)
One's discerning of movement and orientation relative to his or her surroundings and self

Proprioception is especially relevant to architecture because one must negotiate built space by navigating through it and interacting with it. Although proprioception may be thought of as a kind of sixth sense, it actually involves the constant processing of all the other senses relative to one's sense of balance. All architectural materials can be actively felt while the conditioning of a space can be passively felt. All materials can be seen, including glass and clear plastics, as well as other materials that posses the qualities of transparency, reflection, and refraction. All materials possess some sort of acoustic properties in the way they absorb, reflect, direct, and even amplify sound. Many materials possess some sort of smell and taste, especially natural materials which are affected by environmental conditions. People therefore interact with architecture as a collection of sensory stimuli, and it is important to consider design decisions in such terms as they relate to human factors.

Figure 146: Wood grain of acer saccharum (sugar maple).

Finished wood such as sugar maple feels relatively cool and smooth and slightly malleable. The shape and size may reveal the process by which it was cut from a larger whole. The color changes with oxidation to illustrate its age. The wood has a solid bright tone when vibrated and a sweet woody smell. These properties lend themselves to durable surfaces for activities such as indoor sports.

Didactic Material and Space

Montessori didactic materials, such as those produced by Nienhuis Montessori, provide a good example of human factors through sensory stimuli. The pink tower is a tool consisting of a series of cubes of increasing size for learning to distinguish three-dimensional size, the decimal system, geometric concepts, and volume. The brown stair is a related material consisting of a series of square prisms for learning to distinguish width and area to volume relationships. The pink tower consists of ten cubes of hardwood painted pink which increase or decrease by one centimeter in each dimension, whereas the brown stair consists of ten square prisms of unpainted hardwood which increase or decrease by one centimeter in two dimensions. Due to the modular proportions of the materials, they may be employed separately or simultaneously.

The edges of the blocks are just round enough to be comfortable to the touch without distracting from the represented volume. The solid hardwood construction is not only durable, but provides a heft equivalent to the represented volume, and creates a solid sound when placed together or toppled over. The pink paint is important not only to simultaneously distinguish and relate the two sets, but also to subtly signify that the cubes have no directionality. This is distinct from the square prisms whose directionality is present not only in the geometric form, but also in the wood grain.

The design of the box-jointed containers for various materials is also an example of human factors. The type of joint is used expresses the thickness of the material and how it is assembled. Every design decision, no matter how seemingly small, relates to human factors in that it negotiates the requirements of performing some activity with materials that we interpret and interact with based on our senses. This framework may, and indeed should, be applied to every aspect of the architecture of a learning space to maximize the potential for the space to be used as a tool for teaching.

Figure 147: Pink tower and brown stair.

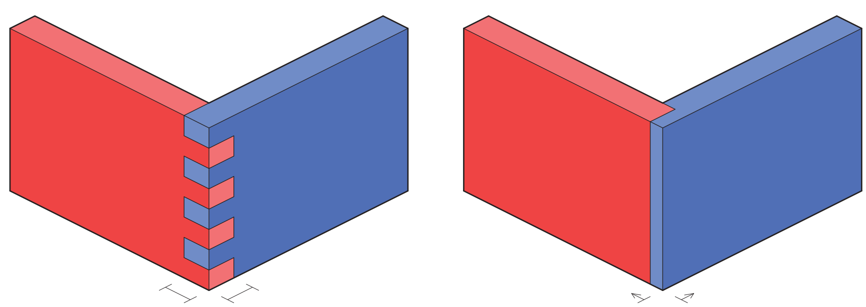


Figure 148: A box joint (left) and a rabbet (right).

Montessori didactic material containers and some furniture pieces use box joints to celebrate the material and display its construction and thickness. Traditional school furniture often employs dado joints which are less expensive to produce but do not reveal the construction or thickness of the material. The school building would double as a teaching tool in itself by employing this mentality to the architectonics of a space.

ECOSYSTEM:

A rich learning environment is an ecosystem that provides diverse and stimulating spaces for the child to learn in. These kinds of spaces are less rigid, and more open to freedom of expression. Hence, multiple dimensions coexist which create a series of hybrid environments. In designing learning spaces for children, the environment should not be a distillation of space and program, but rather a fusion of distinct poles. This complex overlapping allows for a greater range of learning experience.

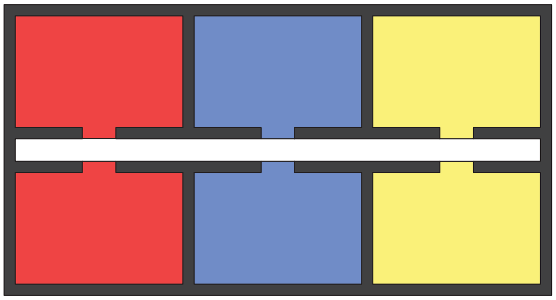
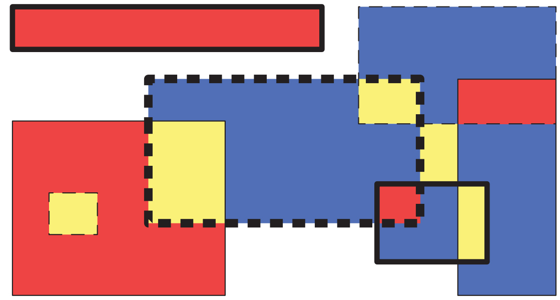


Figure 149 (Left): Distilled learning environment.

Figure 150 (Right): Hybrid learning environment with overlapping space.



CONNECTIVE TISSUE:

An enriched learning environment permits and encourages relational space, held together by connective tissue. This tissue is an ideal metaphor, since it characterizes space not according to function, but rather the flowing of multiple processes of function between other vital elements. This includes the expected and unexpected, where activities might spontaneously arise from a fluid relationship of parts. Interpretation is not defined, but facilitates a unique way of "seeing, reading, studying, and interpreting reality, and representing it with critical awareness."[137] The connective tissue lacks formal rules, allowing the child to formulate his or her own thoughts and experience.

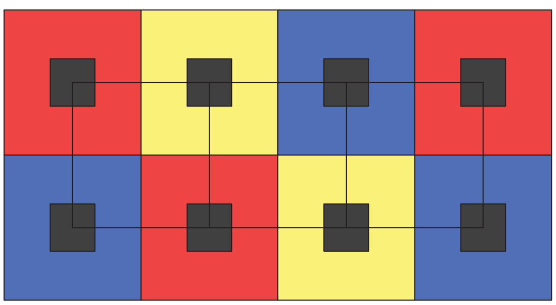
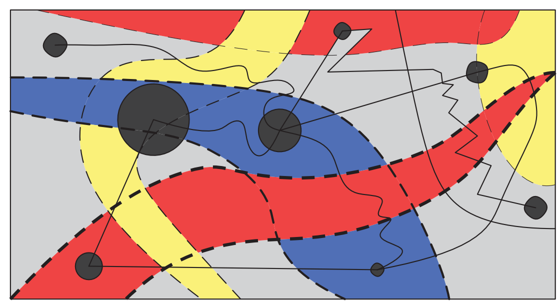


Figure 151 (Left): Learning environment regulated by formal rules.

Figure 152 (Right): Spontaneous and fluid learning environment.



OSMOSIS:

Biologically, osmosis describes the passage of fluid solvents through a selectively permeable membrane. Inherently, this condition of passage requires certain conditions to be present within the solvent; some form of degradation must take place in order for its passage. This process can illustrate that nothing is truly isolated, and that interfaces for the dissipation of information exist in order for information of be exchanged.[138] Our contention will explore this information exchange, primarily between the learner and the environment. These interfaces suppose that boundaries aren't truly boundaries, but membranes that interface between learner and environment for the exchange of information, as opposed to formalized rigid boundaries.

Figure 153 (Left): Learning environment regulated by formal boundaries.

Figure 154 (Right): Learning environment with various membrane interfaces.

MULTISENSORIALITY:

Multisensoriality describes the richness of the sensory experience.[139] Studies have shown that even for very young children, unstimulating environments dull the senses and fail to broaden our perceptions. Learning environments should support varied and overlapping multisensory experiences through light, texture, sound, temperature, and proprioception. This idea emphasizes the profound impact that synesthesia can have on the construction of knowledge through experience.

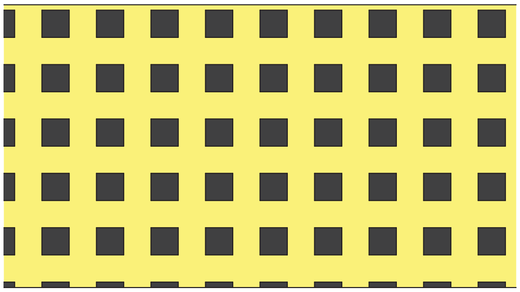
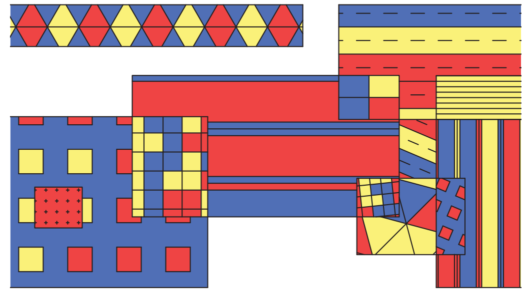


Figure 155 (Left): Simple and overly regulated learning environment.

Figure 156 (Right): Environment with varying and overlapping multisensory textures.



EPIGENESIS:

Epigenesis describes the process by which a biological entity develops through its own evolutionary process, rather than according to its internal DNA sequence. This is related to constructivism, which posits that knowledge is built up through one's personal experiences. Both terms infer a process occurring over time, such that temporality plays a critical role in determining experience. This manifestation of epigenesis can and should be applied to a responsive and transformable learning environment. Like the living organism, the learning environment should evolve to suit modification by the student, and self-learning through interaction. An environment such as this epitomizes learning as a free choice of the individual learner.[140]

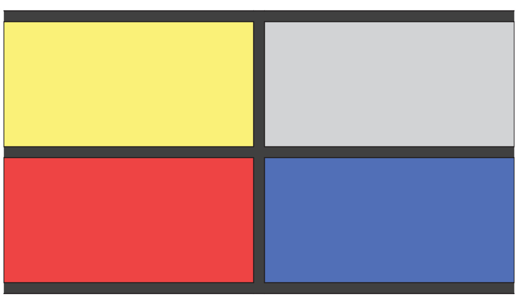
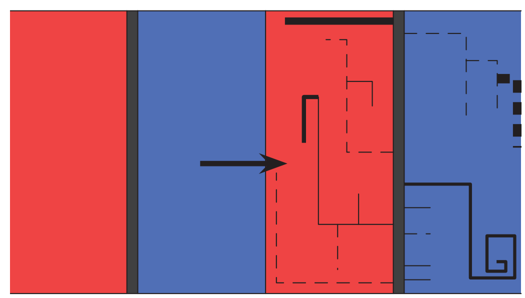


Figure 157 (Left): Non-transformable learning environment.

Figure 158 (Right): Modifiable and interactive learning environment.



CONSTRUCTIVISM:

The most essential component of an effective learning environment is one which creates an adventure for the child. Because constructivism is a cognitive process, the epistemology develops per the unique characteristics of each learner. An environment can nurture the individual's construction of knowledge through a dynamic weaving of space, program, and activity. Thus, to do away with the traditional classroom structure and replace it with ecology of laboratory, shop, and group learning spaces, among which the child is free to move and choose between.[141] Order, then, is replaced by an overlapping network of constant exchange and feedback.

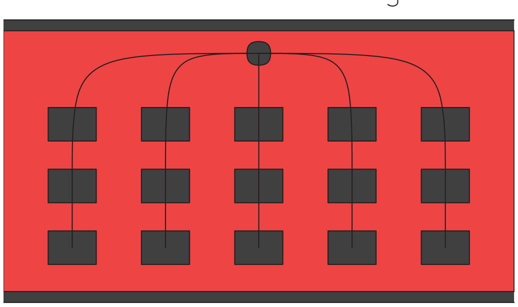
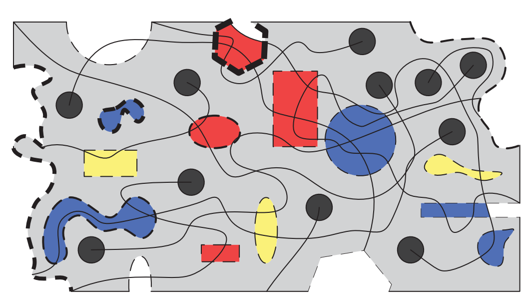
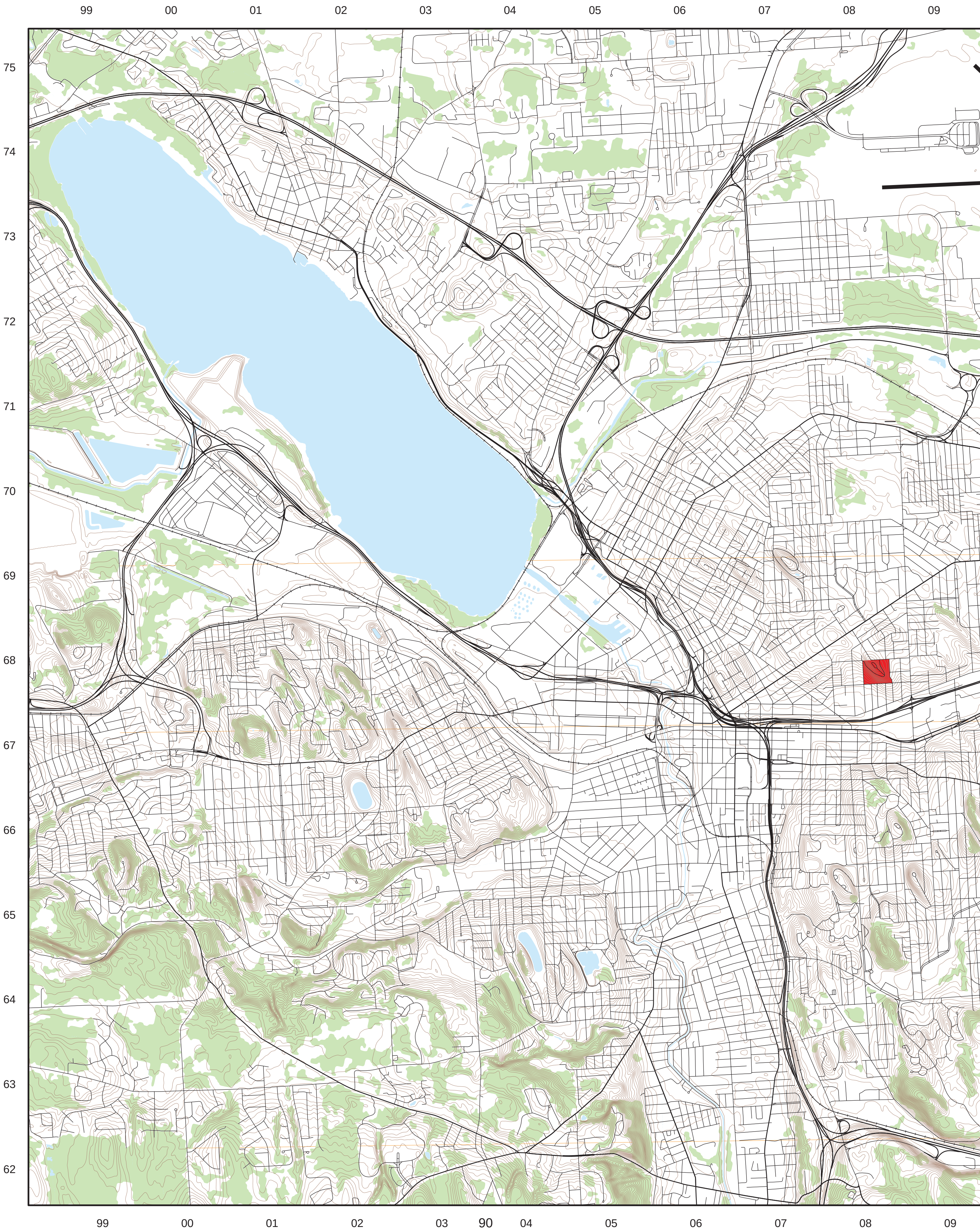


Figure 159 (Left): Traditional dissemination of knowledge.

Figure 160 (Right): Modifiable and interactive learning environment.



Site & Program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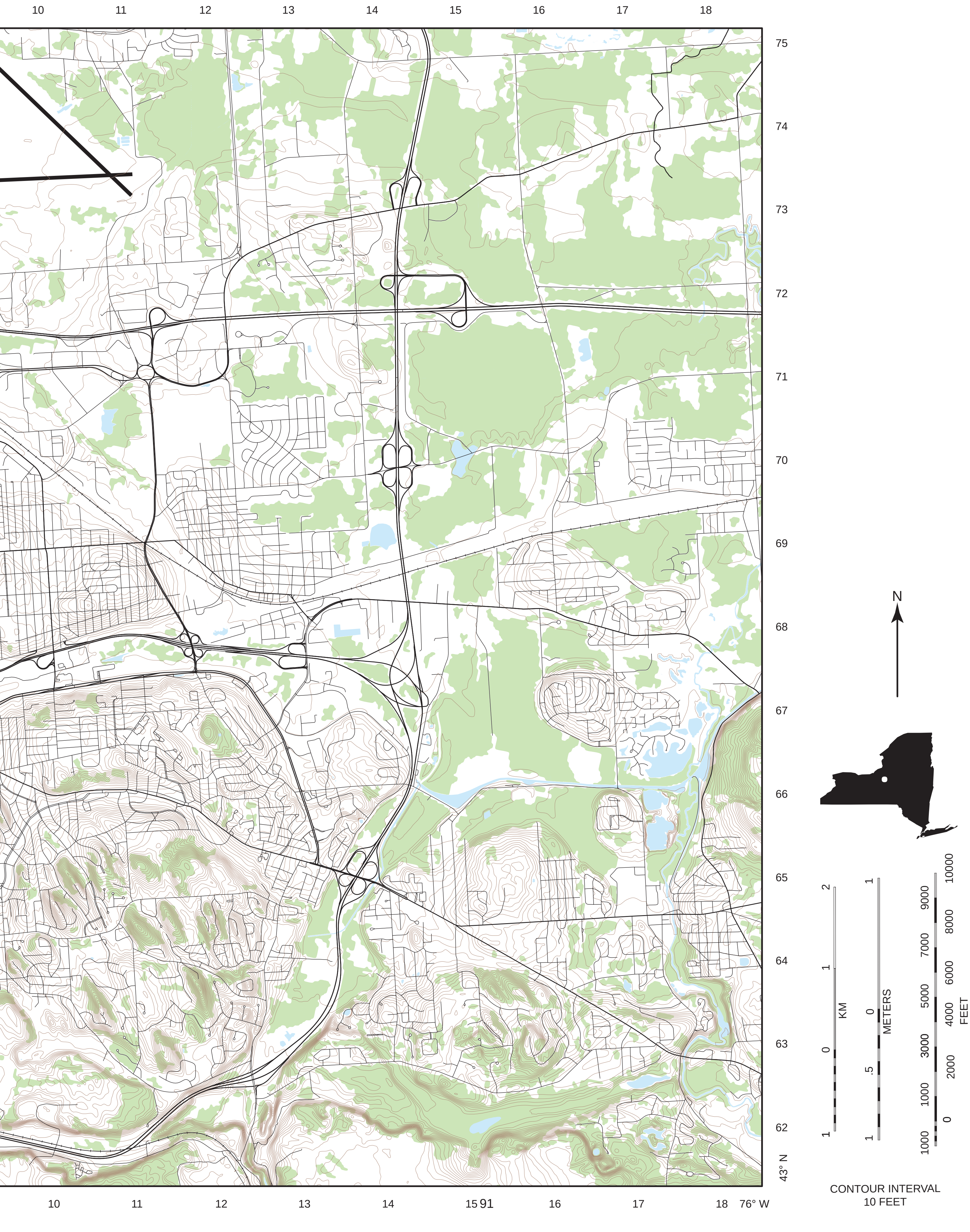
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CONTOUR INTERVAL
10 FEET

Site and Program Selection

The program which best demonstrates the contention is a school. Because elementary school is the phase of education wherein one learns how to learn (as opposed to secondary education, wherein the focus shifts to the ability to retain and apply knowledge), an elementary school is best because it aligns with the constructivist theory of education. In addition, constructivist learning is most beneficial if imparted to a child at the inception of his or her compulsory education, as a framework for secondary and higher education and life in general.[142]

In the New York State school system, elementary school consists of the first through the fourth, fifth or sixth grade (or through eighth in the case of a combined elementary middle/Jr. high school).[143] A small school of around a hundred students, grades K through fifth, ages five through ten respectively, is an appropriate number and age range. Use of the standard grade system is helpful for organizing and comparing a new school curriculum to the traditional system. This range allows for a variation in the design approach with a variety of complexities to the operable components of the school. Also, it allows for the opportunity of creating instances of literal and transformable overlap and separation between different grade levels and other programs.

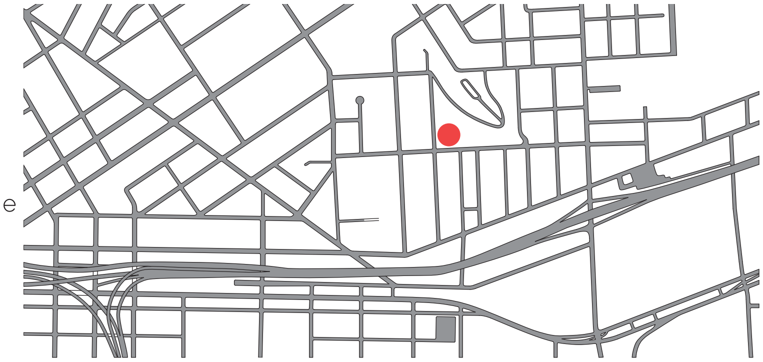
Selection of a site within the United States eliminates the necessity to research an outside culture which is not required to demonstrate the contention. This is an important consideration because, as proposed by Howard Gardner in his Theory of Multiple Intelligences, the objectives of a place of learning are intrinsically related to local cultural values.[144] Although the approach to design proposed by the contention is rooted in approaches to education pioneered and developed primarily in Scandinavia and Italy, the application of the contention may be tailored to serve spaces of learning in any culture or level of education, and to architecture in general.

Refining the site selection area to Syracuse, New York is in keeping with the points above, while allowing for other specific benefits. A familiar sense of the regional culture of the site serves to further define the objectives of the space. In Syracuse, a constructivist school would benefit the educational system which is now aimed at preparing students for careers in the educational and medical sciences, which are best learned by active learning and practice. Close proximity to the site affords an increased ability to visit it in order to obtain a firsthand understanding of its context as it currently exists. Such access also affords us the opportunity to speak with local educators and other community members (such as the principle of Dr. Weeks Elementary, King + King Architects associates, and local residents) about existing conditions and historical perspectives.

The physical manifestation of the contention, as an architecture comprised of transformable components, may benefit from the existing network of related programs in the community. An urban site therefore demonstrates several advantages over a suburban or rural site. In order to make such a comparison, it is necessary to define urbanity in terms of what serves as a benefit or detriment to the contention.

Urbanity Density Gradient:

Downtown	Central Business District
Semiurban	Surrounding Metropolitan Zone
Suburban	Zone Beyond City Limits
Exurban	Prosperous Commuter Zone
Rural	Agricultural Country



An urban site possesses a relatively high density of people and structures and close proximities of schools, housing, parks, playgrounds, athletic courts and fields, libraries, museums, and community and recreation centers. Such existing conditions may be utilized to connect the project with these features of the community and increase access to the school. Sharing of these public entities would not be limited to school classes, but also for hosting afterschool programs, meetings, and other community-wide events, to feature the school as a symbol within the fabric of the community which it is woven into. To avoid complications dealing with politics and social structure, the most reasonable siting for the project is to repurpose some percentage of an existing park space in a thickly settled area.

Originally, the concept of redesigning an existing elementary school was appealing because it appeared as an unobtrusive means for testing the contention on a site. Upon realizing, however, the scale difference as well as the intrinsic uniqueness of the curriculum of a constructivist school, there was a shift to designing the school on unoccupied land, specifically a portion of a park space. Syracuse elementary schools have hundreds of students and teach a general curriculum, whereas a constructivist school would have a much smaller student body and focus on a certain field of education – potentially as an experimental charter school for environmental or education studies.

Lincoln Park was ultimately selected for its proximity to Dr. Weeks Elementary and the attached Northeast Community Center, as well as the existing infrastructure in the park. By constructing the school on the Southwest corner of the park, we hope to activate the site by providing programs shared by the school and community, such as a gym and auditorium. We also hope to connect the community to the existing amenities by redesigning the paths, trails, and stairs throughout the park based upon a study of the patterns of movement through the site and park. Preexisting on the site is a tennis court, ball field, playground, pool, restroom, and lookout. The site selection enables the school to be set back from the street and incorporate the landscape into its formal articulation.

Program
Dimensioned Components

School Size:			
Student Body	120		(6 Grades of 20)
Classrooms:			
Kindergarten (20)	700sqft	9ft ceiling	(35sqft/student)
Toilet room (1)	25sqft	9ft ceiling	(5ft X 5ft)[3]
1st to 5th Grades (20)	600sqft X5	9ft ceiling	(30sqft/student)
Resource Room (5)	250sqft	9ft ceiling	(50sqft/student)
Administrative Suite:			
Principal's Office	180sqft	9ft ceiling	
Vice Principal's Office	120sqft	9ft ceiling	
Secretary's Office	120sqft	9ft ceiling	
Conference Room (10)	300sqft	9ft ceiling	(30sqft/student)
Break Room (10)	300sqft	9ft ceiling	(30sqft/student)
Health Suite:			
Waiting Space (2)	60sqft	9ft ceiling	(30sqft/student)
Bathroom (1)	25sqft	9ft ceiling	
Resting Space (2)	80sqft	9ft ceiling	(40sqft/student)
Nurse's Office	120sqft	9ft ceiling	
Guidance Office	120sqft	9ft ceiling	
Collective Spaces:			
Lobby (40)	1200sqft	20ft ceiling	(30sqft/student)
Art Room (20)	600sqft	9ft ceiling	(30sqft/student)
Music Room (20)	600sqft	9ft ceiling	(30sqft/student)
Library (20)	500sqft	20ft ceiling	(25sqft/student)
Librarian's Office	120sqft	9ft ceiling	
Cafeteria (60)	1,080sqft	20ft ceiling	(18sqft/person)
Gymnasium			
Court	4,200sqft	20ft ceiling	(84ft X 50ft)
Bleachers (50)	350sqft	20ft ceiling	(7sqft/person)
Auditorium			
Seating (120)	840sqft	20ft ceiling	(7sqft/person)
Stage	350sqft	25ft ceiling	

Toilet Rooms:

Female:	120sqft	9ft ceiling	(2sinks; 2 stalls)
Male:	120sqft	9ft ceiling	(2sinks; 1 stall; 2 urinals)

Service:

Storage	...	9ft ceiling
Tele-Data Room	25sqft	9ft ceiling
Mechanical Room	...	9ft ceiling
Kitchen, Pantry, Dish Room	600sqft	20ft ceiling
Custodial Room	35sqft	9ft ceiling

Exterior Spaces

- Play Grounds
- Courts and Fields
- Gardens
- Parking

Grounds and Maintenance

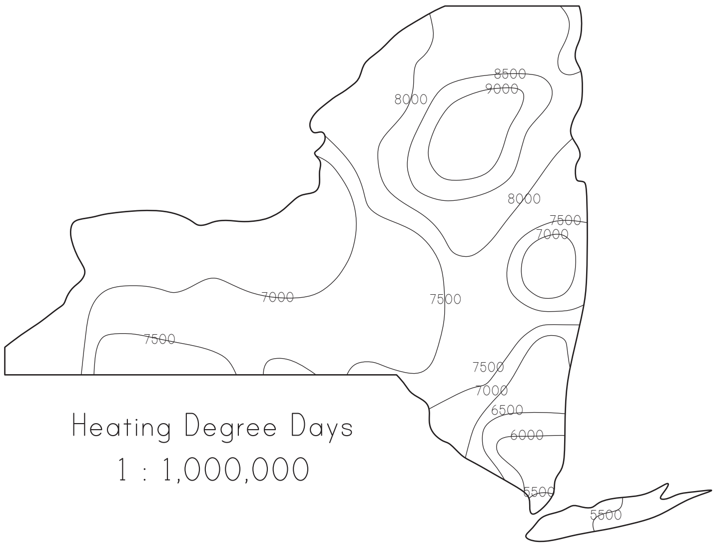
Paths and Steps

Pool Building

Program:	Activities:	Adjacencies:	Separations:	Open/closed:	Lighting Type:
Kindergarten	Activity; play; sleep	Toilet; classes; court	-	T Cluster court	diffuse single
1st to 5th grades	Activity; instruction	Toilet; classes; court	-	T Cluster court	diffuse double
Resource room	Activity; instruction	Toilet; classes; court	-	T Cluster court	diffuse double
Principal's office	Administrative work	Other administration	Gymnasium	C	diffuse single
V. Principal's office	Administrative work	Other administration	Gymnasium	C	diffuse single
Secretaries' office	Administrative work	Other administration	Gymnasium	O Lobby	diffuse single
Conference room	Present; discuss	Administration; hall	Gymnasium	C	diffuse dimmer
Break room	Relax; eat; converse	Administration;Toilet	Gymnasium	C	diffuse single
Toilet rooms (kids)	Relieve; wash	Classes	-	C	diffuse single
Resting space	Relax; sleep	Nurses' office	Gymnasium	C	diffuse dimmer
Nurse's office	Assess; assist	Administration	Gymnasium	C	diffuse single
Guidance office	Assess; assist	Administration	Gymnasium	C	diffuse single
Lobby	Gather; converse	Offices; Gym; Aud.	Classes	T Outside	d and d dimmer
Art room	Watch, create	Resource; music; cy	Gymnasium	T Music room	d and d double
Music room	Listen; create	Resource; art; court	Gymnasium	T Art room	diffuse single
Library	Listen; read	Librarian, court	Gymnasium	C	diffuse single
Librarian's office	Administrative work	Library	Gymnasium	C	diffuse single
Cafeteria	Eat; converse	Kitchen, dish room	Administration	T Outside; Courts	d and d double
Gymnasium	Kinesthetic play	Locker room; lobby	Administration	T Outside; Courts	d and d dimmer
Auditorium	Watch; listen	Lobby; stage	Mechanical room	C	Controlled
Stage	Perform	Auditorium	Mechanical room	T Auditorium	Controlled
Storage	Store; access	Gymnasium	-	C	diffuse single
Courtyards	Activity; instruction	Classes, library	-	T Classes, ETC	diffuse double
Tele-data room	House; service	Administration	-	C	diffuse single
Mechanical room	House; service	-	Most things	C	diffuse single
Kitchen, dish room	Cook, serve, wash	Cafeteria	Most things	C	d and d single
Custodial room	Store; access	X	-	C	diffuse single
Play grounds	Kinesthetic play	Gymnasium	-	(Outside)	direct
Courts and fields	Kinesthetic play	Play grounds	-	(Outside)	d and d single
Gardens	Plant; tend; harvest	X	-	(Outside)	direct
Locker Room	Wash; change	Gymnasium	Administration	C	diffuse single

Brightness (fc)	Acoustics (rel. vol.)	Materials:	Multivalence:	Entry Via:	Window Type:
30	Project 30-35	gypsum; wood	Transformable	hall; court	clearstory, level
30	Project 30-35	gypsum; wood	Transformable	hall; court	clearstory, level
30	Project 30-35	gypsum; wood	Transformable	hall; court	clearstory, level
30	Absorb 25-35	gypsum; wood	Closed	secretarys' office	level
30	Absorb 25-35	gypsum; wood	Closed	secretarys' office	level
30	Absorb 25-35	gypsum; wood	Closed	lobby	level
30	Project 30-35	gypsum; wood	Transformable	hall	clearstory op
20	Project 30-35	gypsum; wood	Closed	hall; secretarys'	level or none
10	Absorb 30-35	concrete; wood	Closed	hall; Kindergarten	clearstory / high
10	Insolate 20-25	fabric; wood	Closed	nurse's office	level opp
30	Absorb 20-30	concrete; wood	Closed	hall	level
30	Absorb 25-35	gypsum; wood	Closed	hall; secretarys'	level
20	Project 35-45	gypsum; wood	Transformable	Outside	clearstory, level
30	Project 30-35	gypsum; wood	Transformable	hall; court	clearstory, level
30	Project 30-35	gypsum; wood	Transformable	hall; court	clearstory, level
30	Absorb 30-40	gypsum; wood	Closed	hall; court	clearstory, level
30	Absorb 25-35	gypsum; wood	Closed	library	level
20	Absorb 40-50	concrete; wood	Transformable	hall	clearstory, level
20	Absorb 40-50	concrete; wood	Transformable	lobby	clearstory
10	Insolate 20-25	fabric; wood	Transformable	lobby	None
30*	Project 20-25*	concrete; wood	Transformable	auditorium	None
10	Absorb N/A	gypsum; wood	Closed	hall	None
20	Project 30-35	concrete; wood	Transformable	classes; library	Level, high
10	Absorb N/A	gypsum	Closed	secretarys' office	None
10	Absorb N/A	gypsum	Closed	hall	None
30	Absorb 20-25	gypsum	Closed	hall; outside	Level, high
10	Absorb N/A	gypsum	Closed	hall	None
N/A	N/A	grass; wood	Transformable	N/A	N/A
20	N/A	grass	Transformable	N/A	N/A
N/A	N/A	plants; wood	Transformable	N/A	N/A
10	Absorb 40-50	concrete; wood	Closed	lobby; gym	clearstory, high

Climatic Data



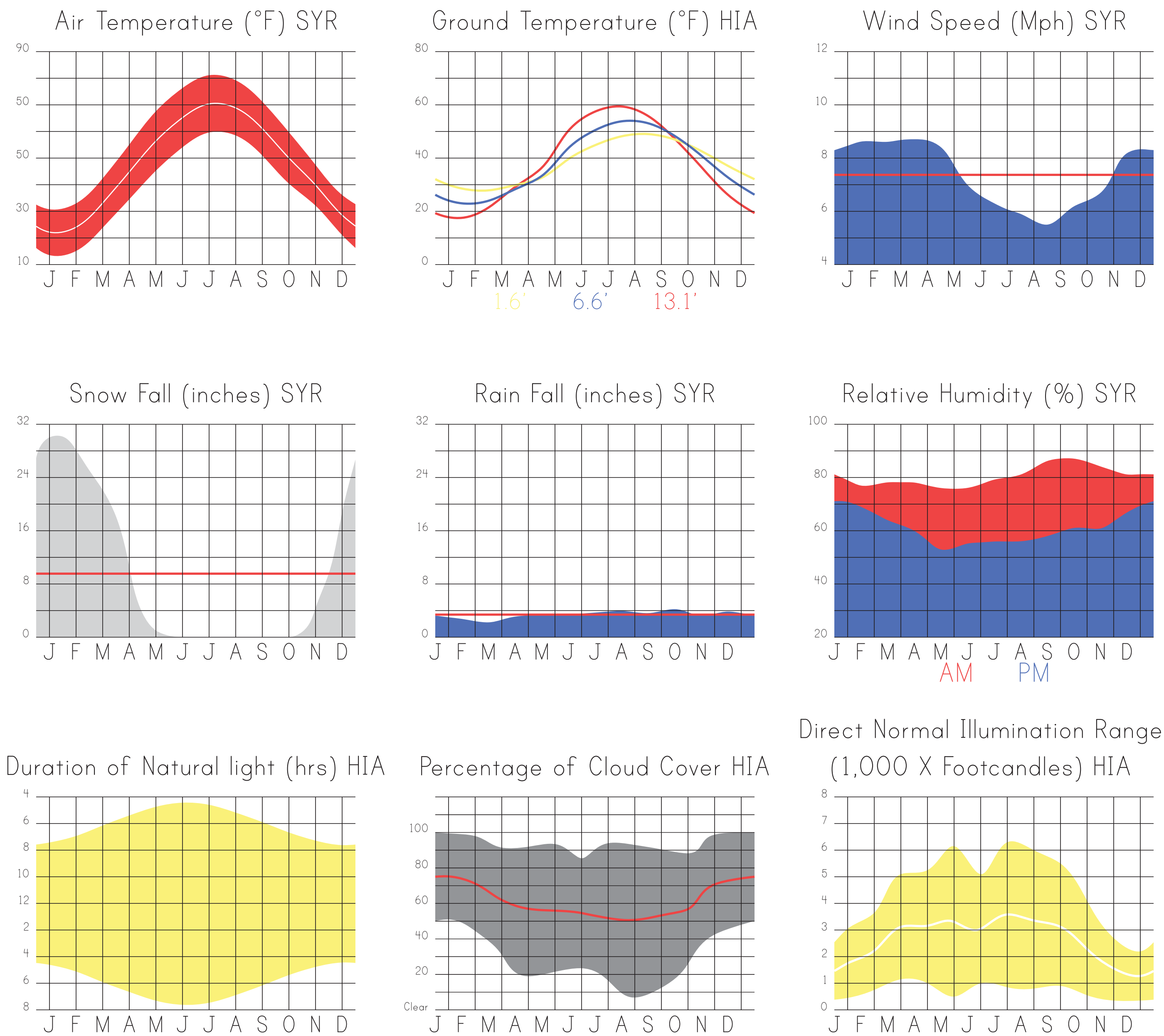
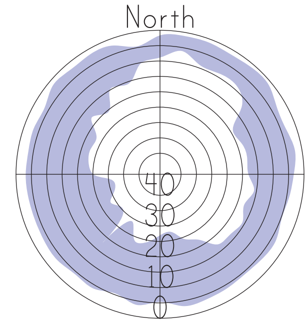


Figure 162: Data From Syracuse Hancock International Airport (4 miles away).

Wind Roses

Minimum and maximum average wind speed in mph by cardinal direction. The wind patterns of this region are caused by the warm, humid southwest winds and the cold, dry north winds as they move along the coast. The prevailing wind throughout the year comes from the West. The average speed is around 8 mph.



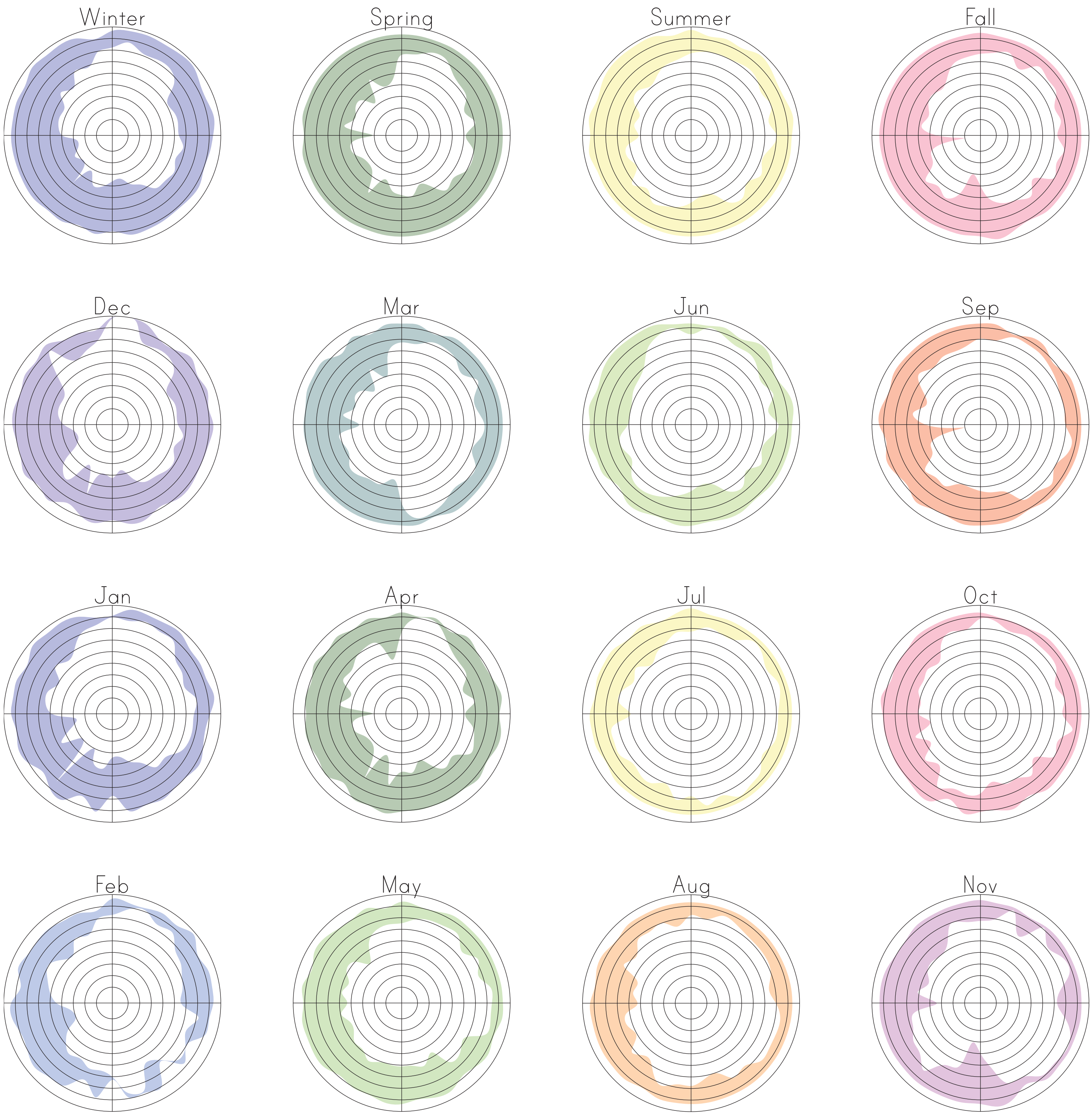


Figure 163: Data From the City of Syracuse and Syracuse Hancock International Airport (4 miles away).

Figure 164: View towards the northeast, from the southeast corner of the site at the corner of Mather and Hawley.

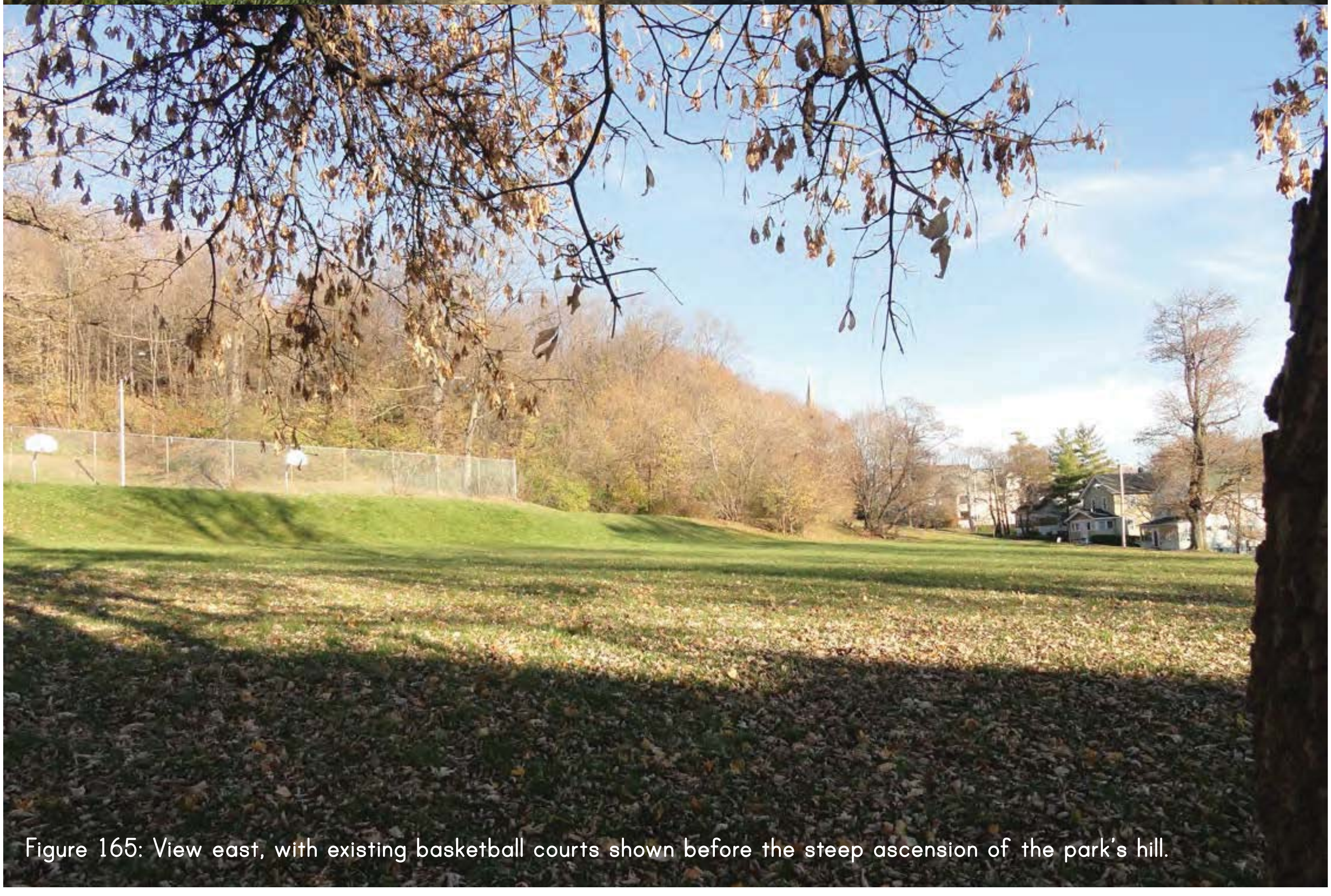


Figure 165: View east, with existing basketball courts shown before the steep ascension of the park's hill.

Figure 166: View to the west, showing the gradual grade of the proposed corner site.

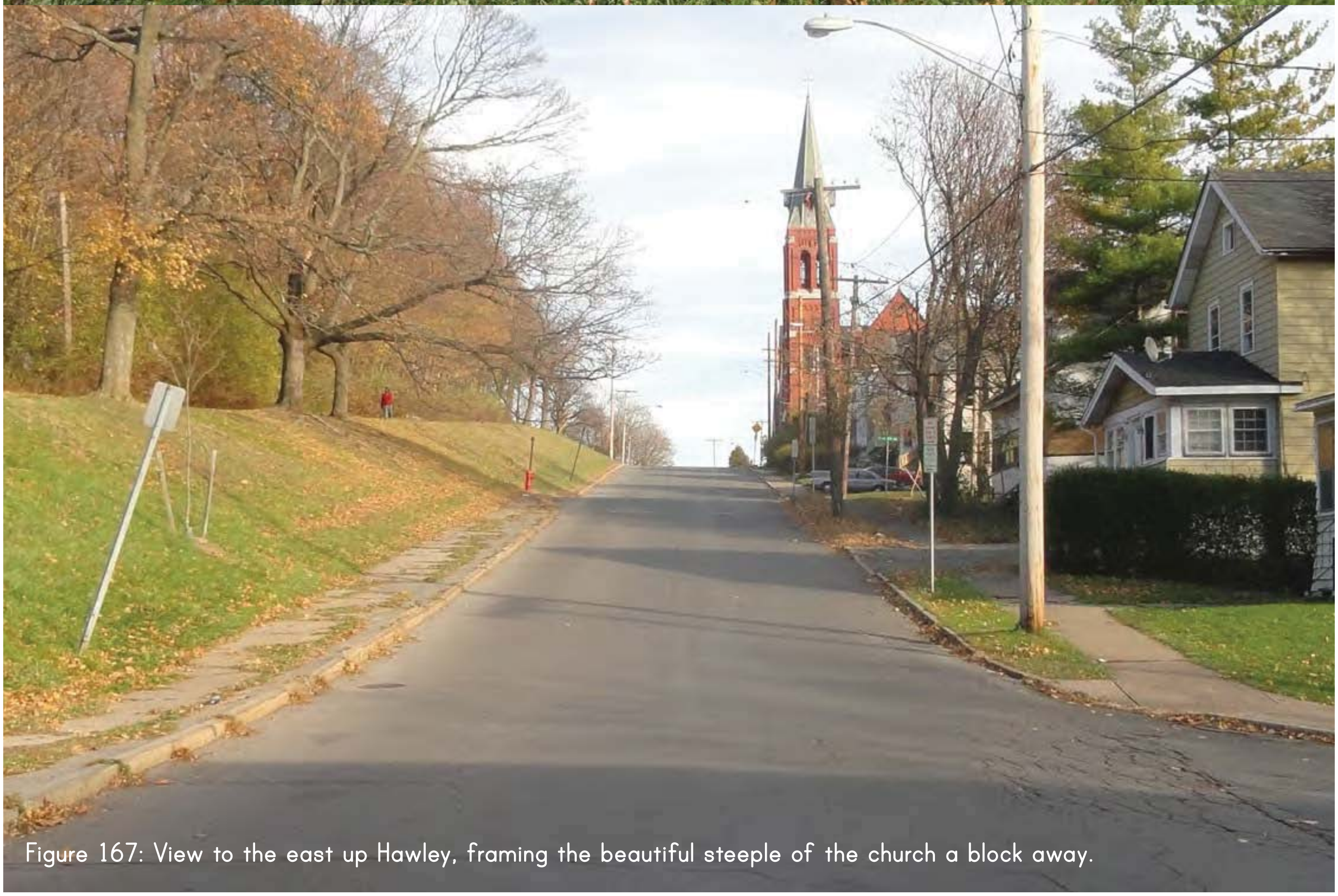


Figure 167: View to the east up Hawley, framing the beautiful steeple of the church a block away.

Figure 168: View west along existing brick sidewalk.

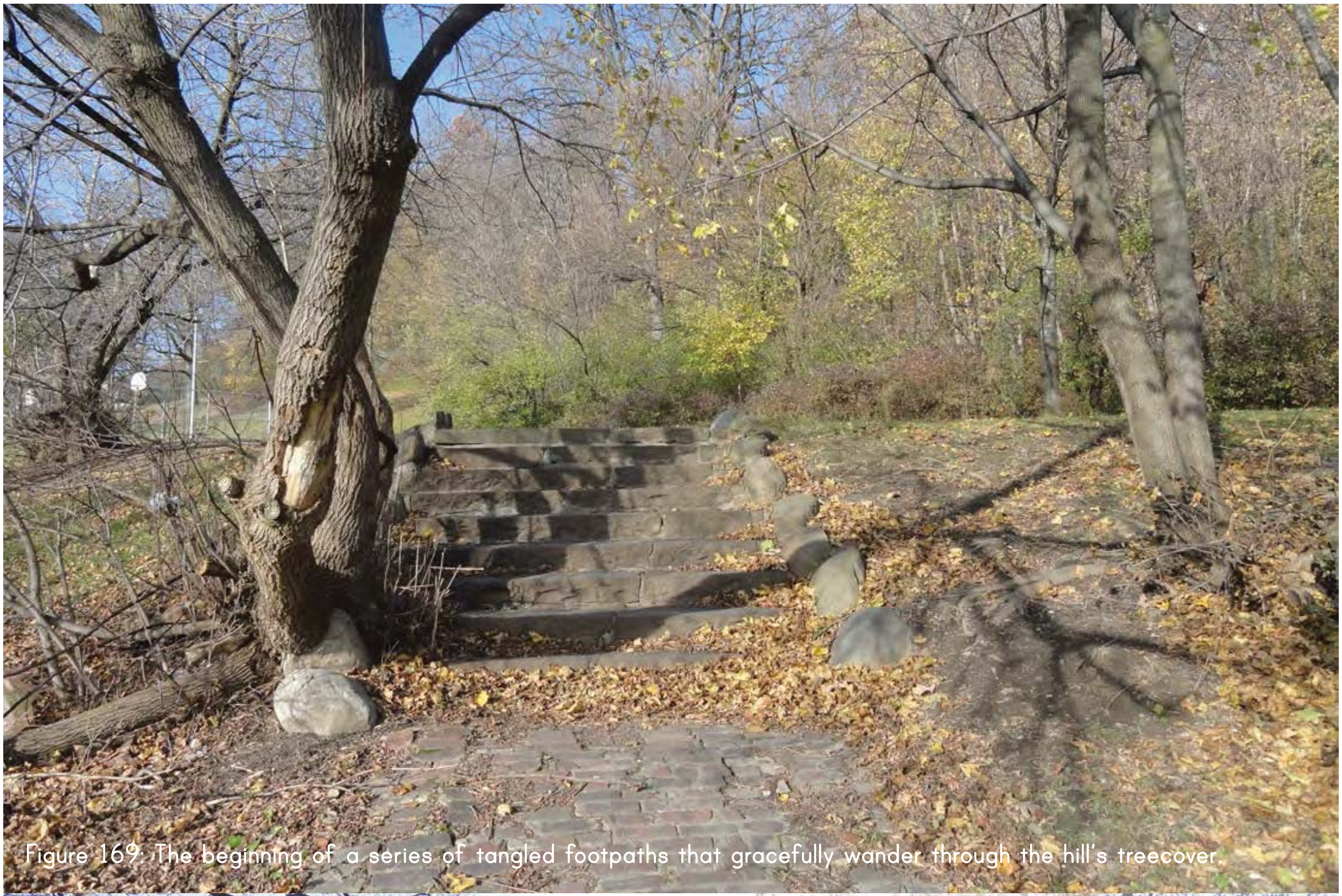


Figure 169: The beginning of a series of tangled footpaths that gracefully wander through the hill's treecover.

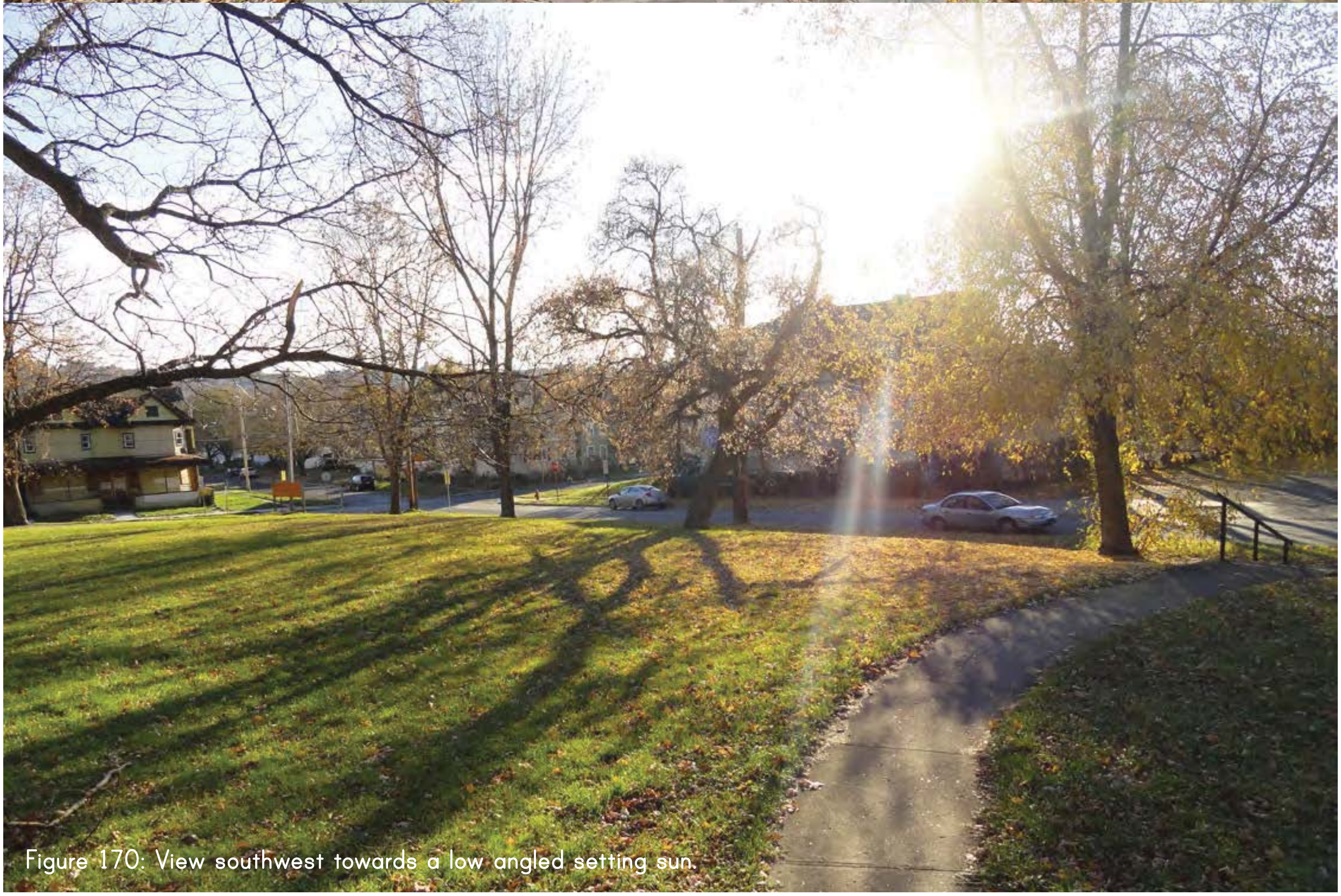
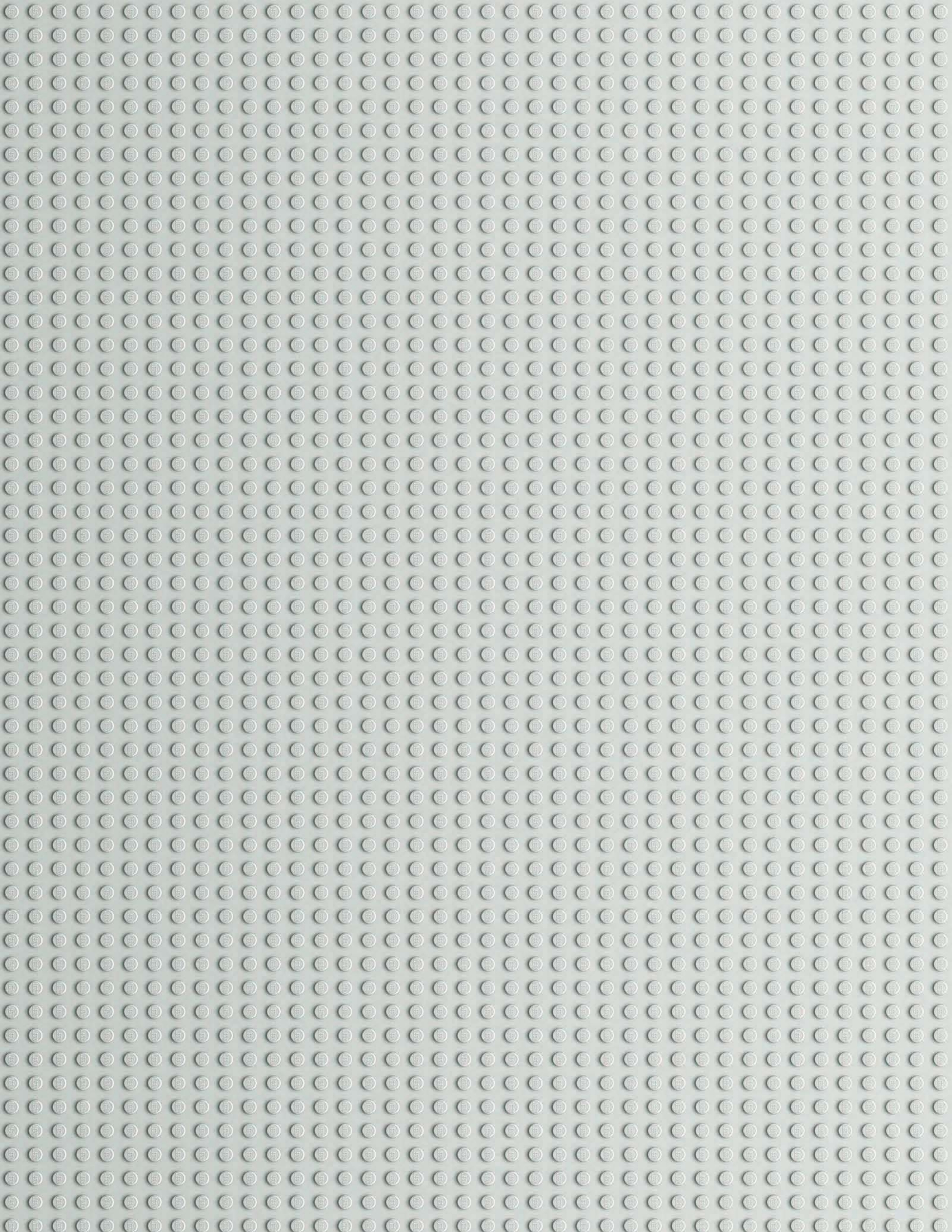


Figure 170: View southwest towards a low angled setting sun.



Studies

Figure 171: Renderings of model, with louvers opened at various angles.

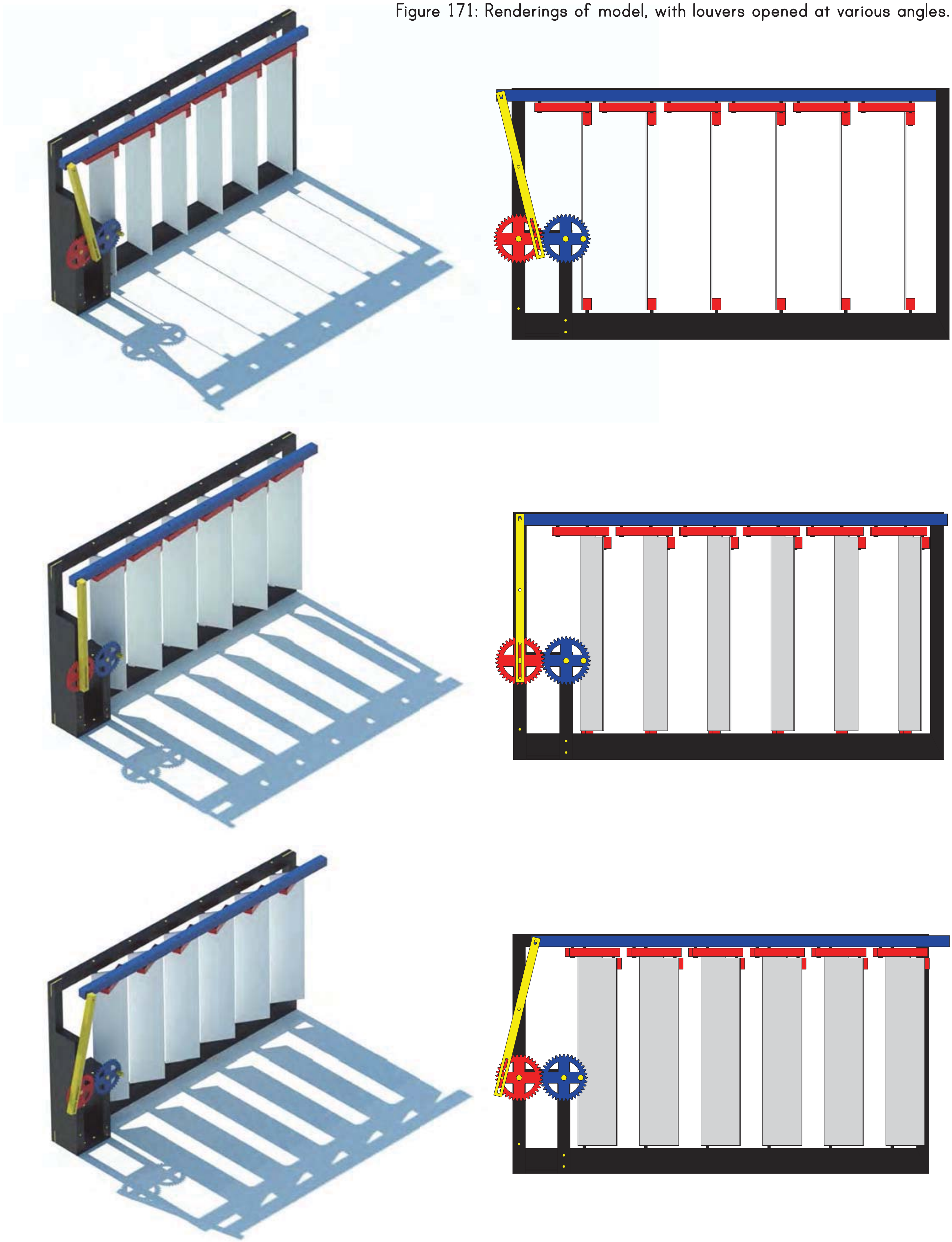
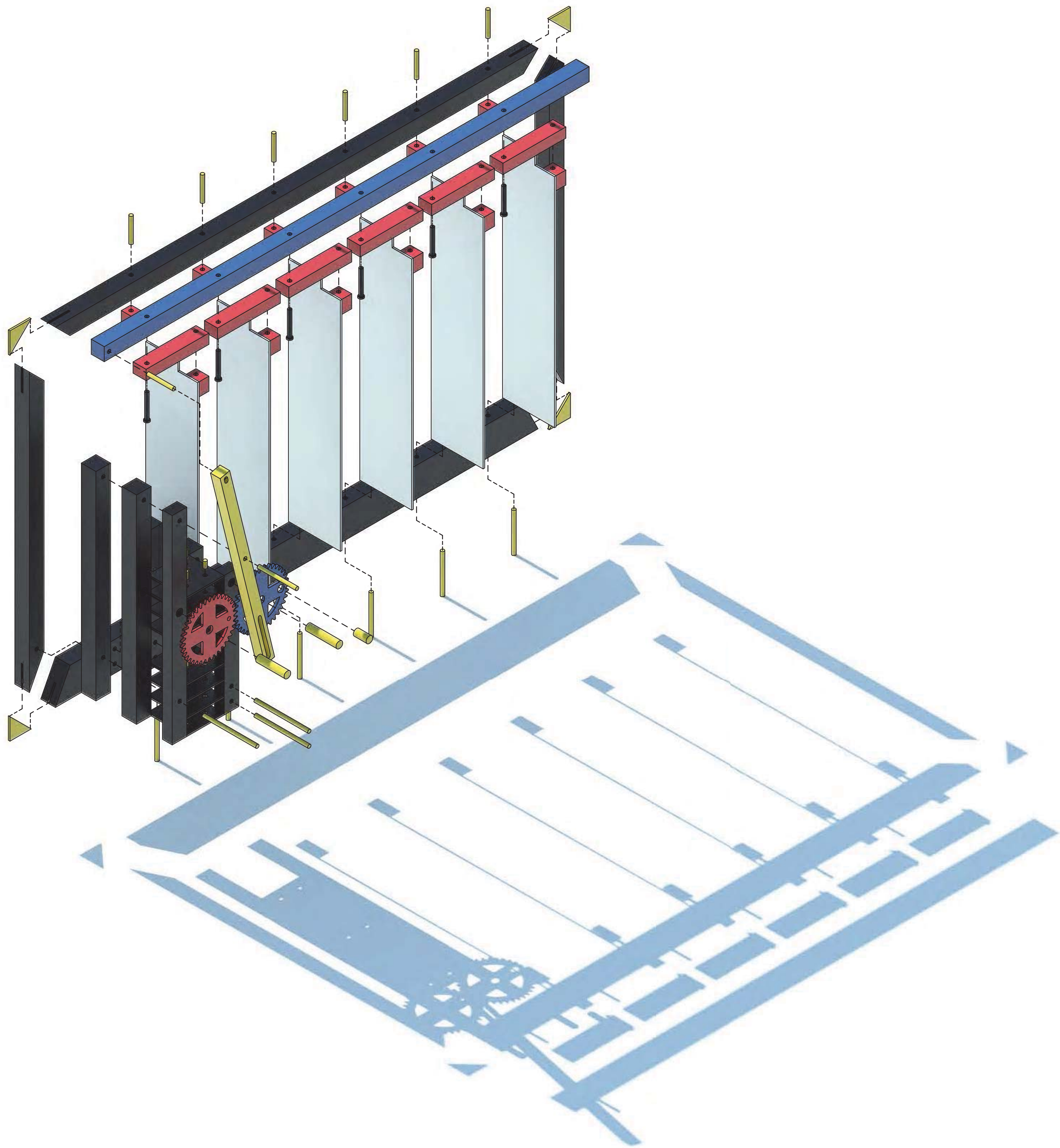


Figure 172: Isometric rendering of a study model created at the outset of our cooperative odyssey in a charrette undertaken to better understand the manifestation of our goals through our thesis. The central idea was to create a louver-like system as a means of testing the filtering of light and views. The operation requires physical input by the user to turn a wheel system which translates the motion to a series of gears and other moving components. Implemented at the scale of a wall system, the idea is intended to operate at the hands of a child user. The logic behind color-coding the separate pieces and components is to allow for an easier understanding of how connections are achieved. This also correlates to our thesis, which posits that the didactic use of color and material can help the child user understand connection, movement, and construction, as well as other physical properties of a system.



Piano hinge Campaign Desk

This campaign desk was designed for a furniture design and fabrication course. The goal was to create a portable work station for guitar repair and drafting. The piece consists of aspen board, maple plywood, and brass piano hinges. The materials are each used to their respective advantages and celebrated in the final piece. By hinging in multiple axes, the desk may be used or stored in a relatively flat compact position, or raised to work surface height. The incline of the top of the desk is infinitely adjustable for drawing. The parts tray panel is removable for providing birth to a headstock and the drawers are deep and shallow for small parts and utensil storage. The desk was also designed to be produced from a single sheet of plywood and formatted to enable reuse of the material upon the end of the piece's life.

Figure 173: Rendering of concept mockup for stool.

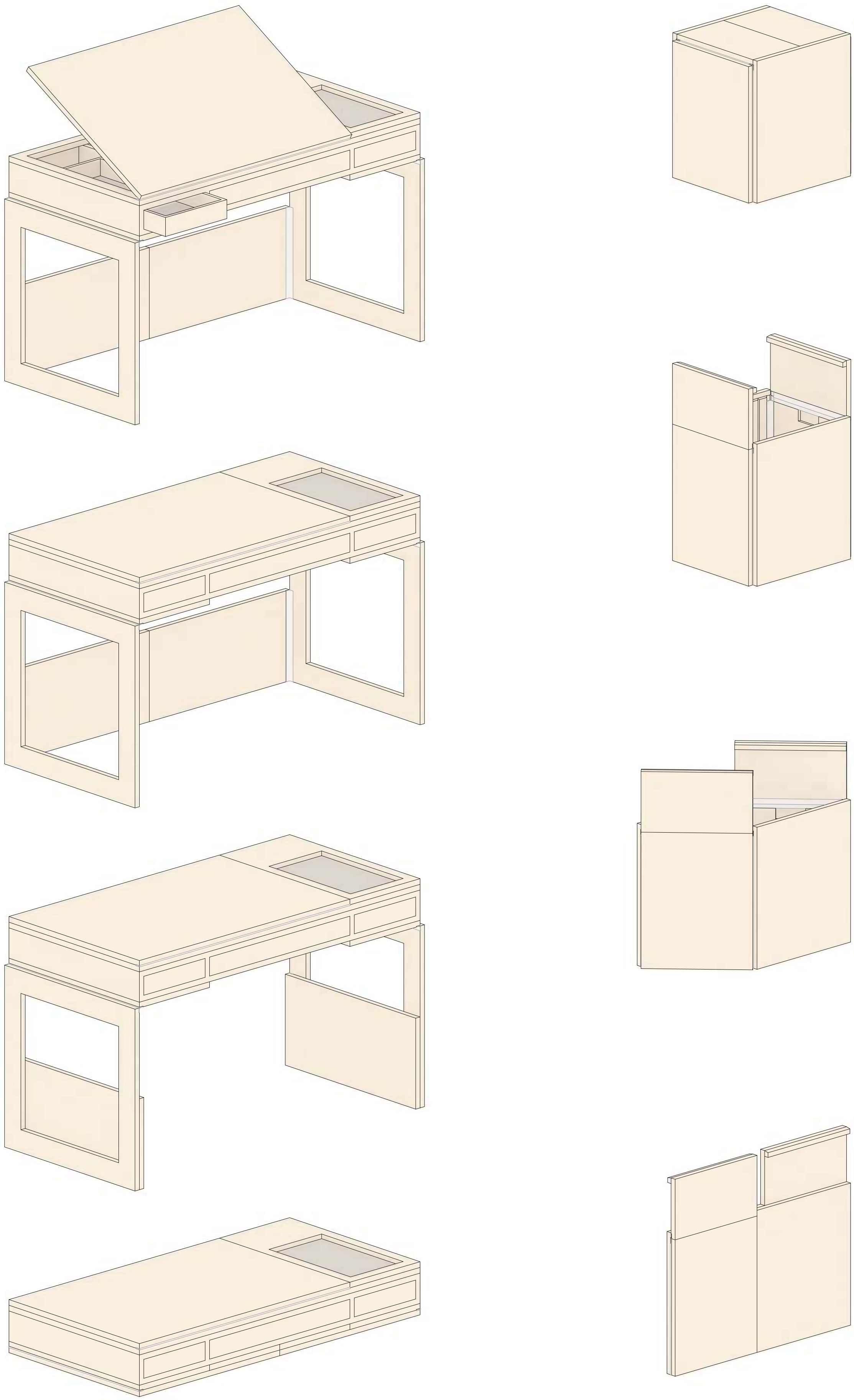


Figure 174: Rendering of desk collapsing.

Contention Development

Distinct from traditional architecture in education, the application of constructivist philosophy to the physical aspects of a learning environment produces engaging spaces of learning that foster the learners' social and cognitive development by anticipating and facilitating the observation, interpretation, and modification of the environment itself by the learner.

Nov 6th

Applying constructivist philosophy to the architectonics of an elementary school fosters and augments the learners' cognitive and social development by facilitating learning through direct handling by the learners, and thereby generating an architecture which serves as a device for constructing knowledge.

Nov 12th

The constructivist theory of education is applicable to both curricula and architecture. Designing an elementary school within a constructivist framework generates an interactive and transformable learning environment through which children generate learning experience. The design of the school enables children to operate the architecture as a system of components such as cranks, gears, and pulleys. Such architecture allows children to continually reinterpret the built environment in a multiplicity of ways, facilitating the construction of knowledge.

Nov 18th

The constructivist theory of education is applicable to both curricula and architecture. Designing a school within a constructivist framework will generate an interactive learning environment. The design of a constructivist school enables children to continuously transform their spaces by interacting with a composition of interpretable and operable components. Allowing children to continually reinterpret the built environment in a multiplicity of ways facilitates the construction of knowledge through experience.

Nov 30th

Tentative Process

Schedule:

	Week	Scale	Focus
January, 13		First Day of Classes	
January:			
-	13 – 17	Large	Site Context, Program Relationships, Building Scale Parti,
-	20 – 24	Large	" "
-	27 – 31	Medium	Design effects and Components
			Design architecture as a syllabus:
			Conceive Potential Lessons List
	Small		Conceive Potential Mechanics List
	Large		Enforce Lesson with Mechanics and Vice Versa to Yield Didactic Architectural Components
			Locate/Aggregate Components to Yield Space Making and (Transformable) Program Relationships
			Sketch to Digital and Digital to Physical Production of Component Studies/Mockups at various Scales
February:			
-	3 – 7		Establish and Develop Program Relationships
-	10 – 14		Situate 'Building' in Relation to Site Context and Community Scale Parti
-	17 – 21		Review One Production of Current Progress
-	24 – 28		Begin Process Anew with Feedback
March:			
-	3 – 7		Focus on the Classroom Scale (Composition of Components)
-	10 – 14		(Spring Break) Post Analysis of Components
-	17 – 21		Focus on the Building Scale (Composition of Spaces)
-	24 – 28		Review Two Production of Current Progress
April:			
-	31 – 4		Advance and Refine Design
-	7 – 4		Transition to Production
-	14 – 18		Production and Resolution
-	21 – 25		Final Production
April, 29		Last Day of Classes	

Partial Final Production Expectations:

Extra Large:
Site Context Drawings

Large:
Site Model of Immediate Context (Urban fabric, Existing Amenities, Topography, ETC.)

Medium
Architectural Drawings and Renderings (Plans, Sections, and Elevations), Large Scale Operable Building Model

Small:
Architectural Drawings, Schematic/Shop Drawings and Renderings of Component Mockups and Mechanism Studies

Extra Small:
Architectural Drawing, Schematic/Shop Drawings and Renderings of Building Details

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A book of beautiful, full page images, with useful excerpts from interviews with the architect.

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Within this volume is an entire section on the environment as a learning tool in the Reggio Emilia education, with quotes from Malaguzzi and other prominent theorists about the importance of architecture in the lives of Reggio schoolchildren.


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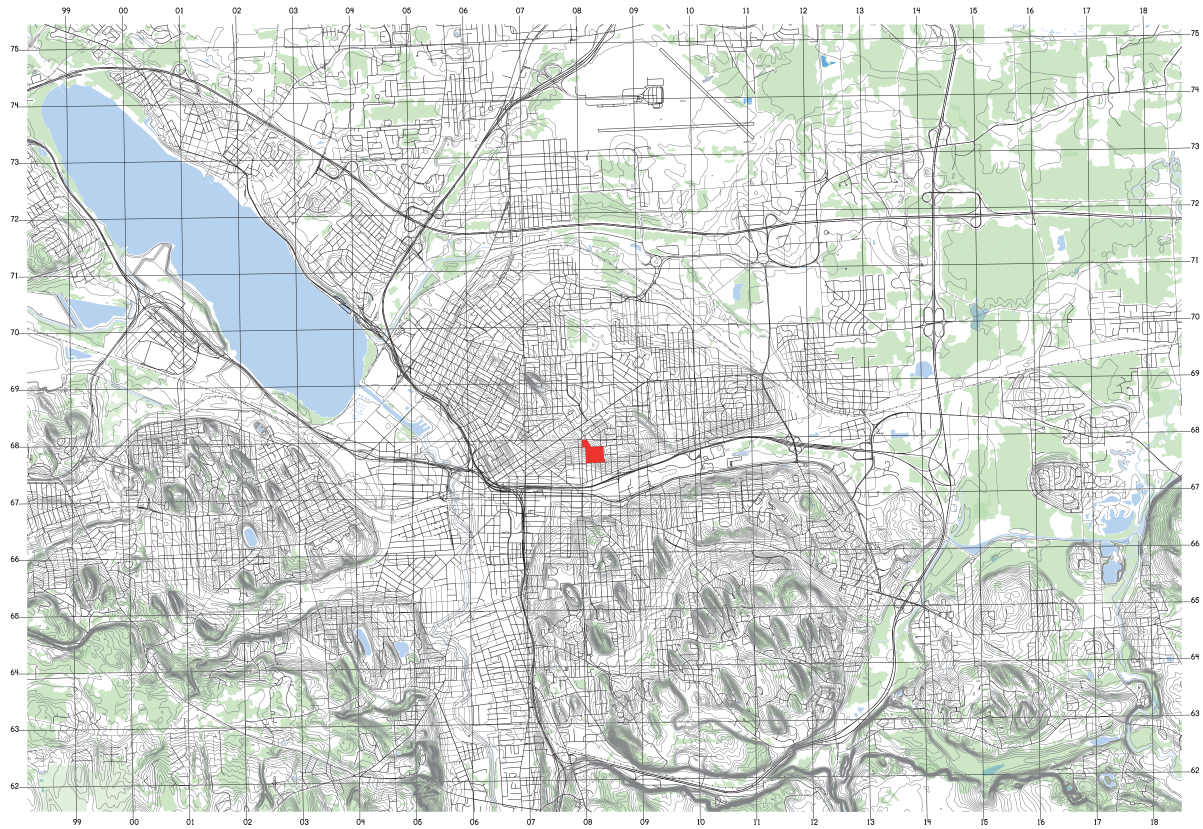
The John Dewey Constructivist School
Elementary School
Lincoln Park, Syracuse NY

Places of Learning
Thesis Research Studio
Professor Terrence Goode

Eric LeBlanc
Tyler Ferrusi

Designing a school within a constructivist framework will generate an interactive learning environment. The design of a constructivist school enables children to continuously transform their spaces by interacting with a composition of interpretable and operable components. By allowing children to reinterpret the built environment in a multiplicity of ways, the construction of knowledge is facilitated through experimentation and experience.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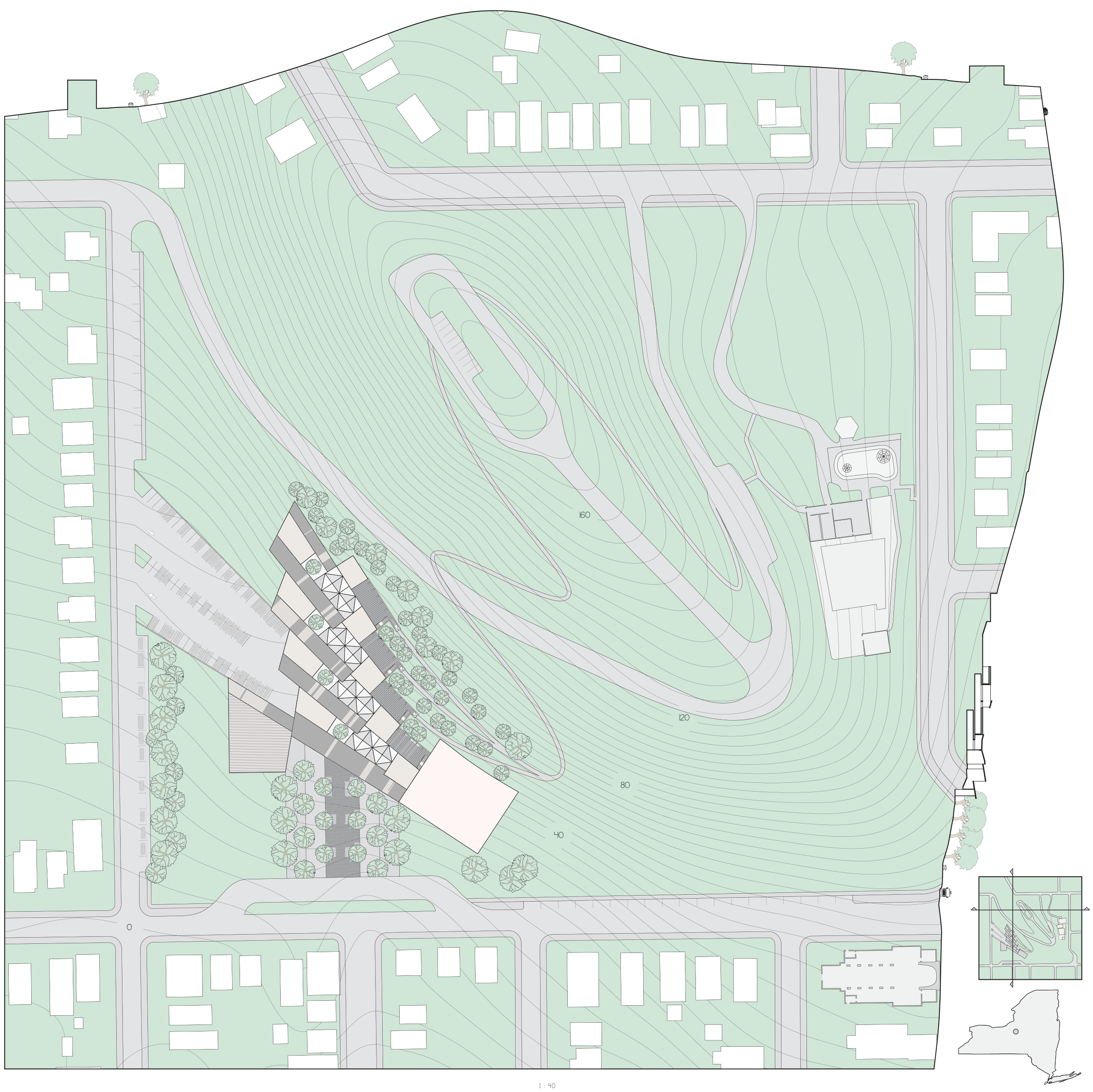
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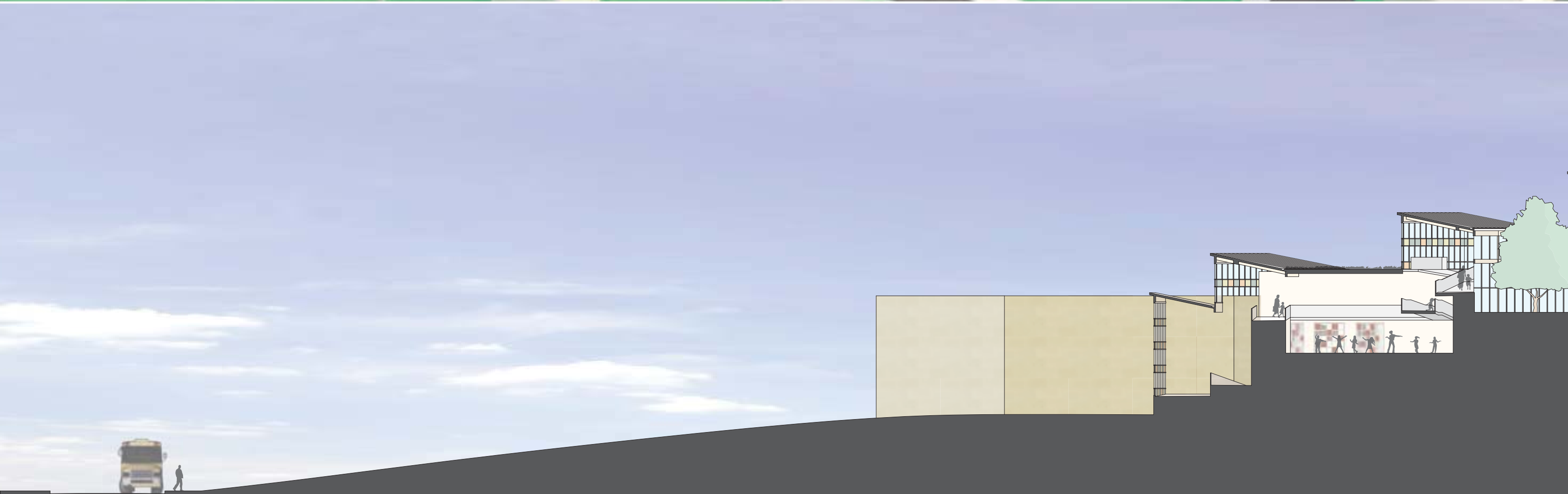

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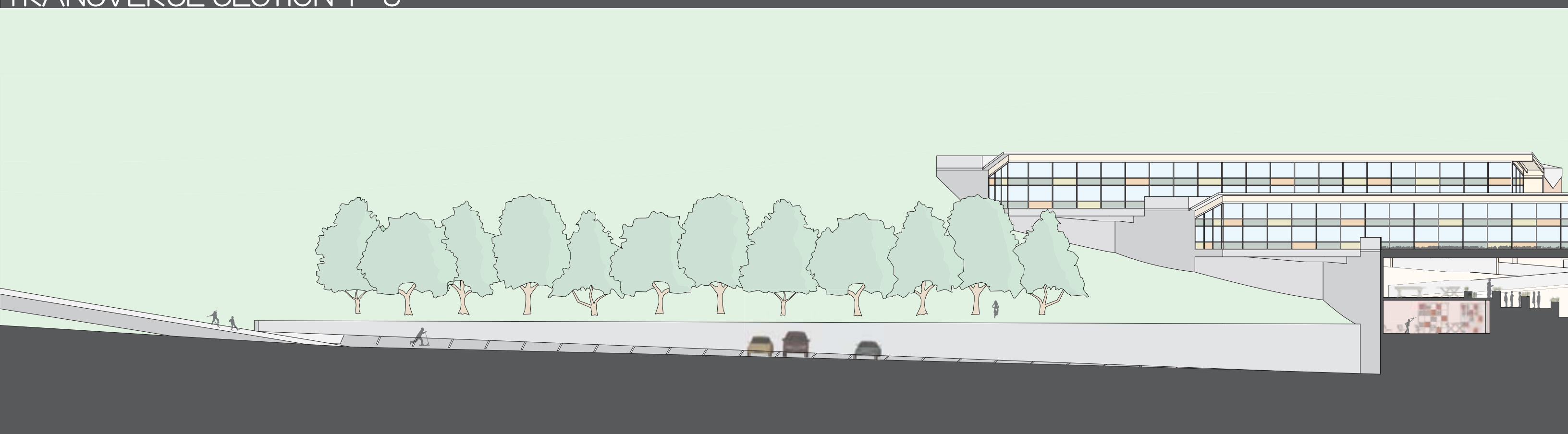

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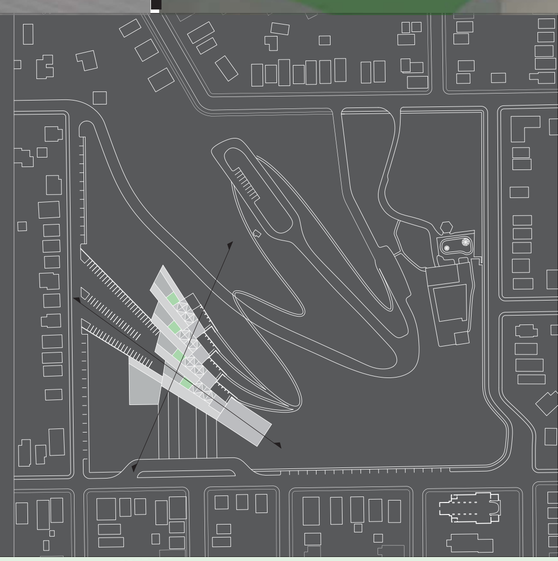
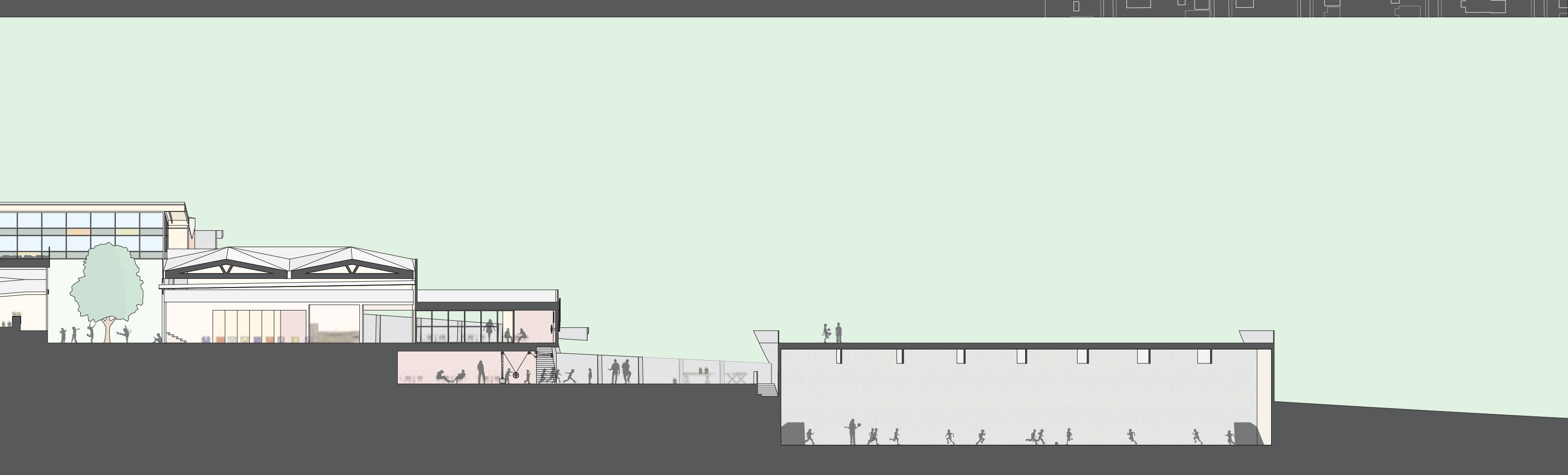

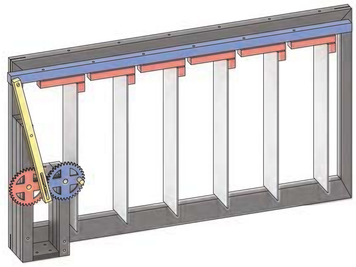
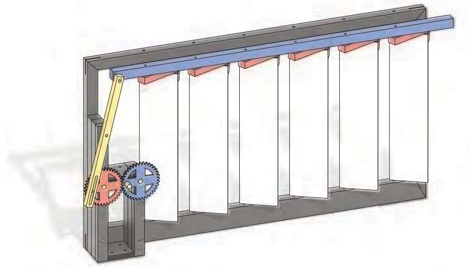
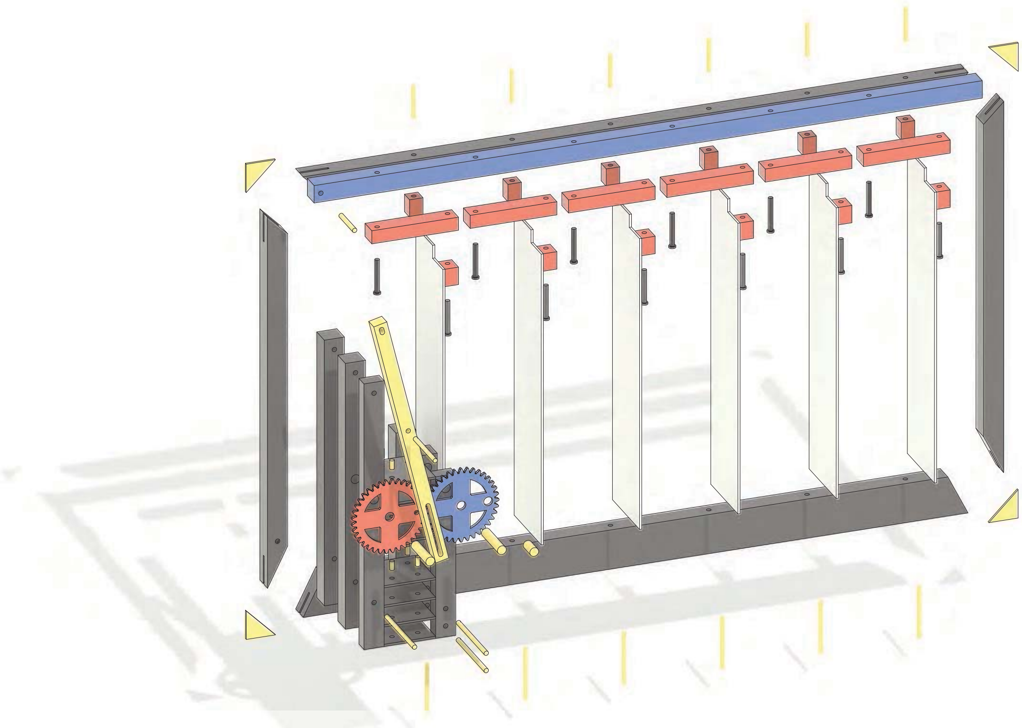
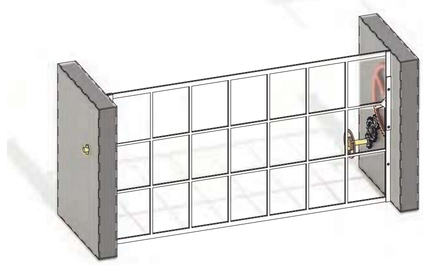
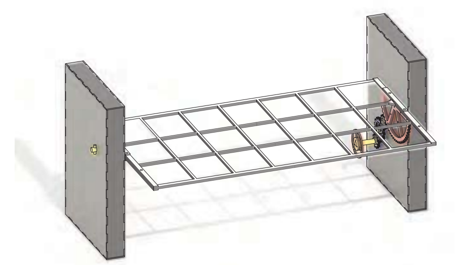
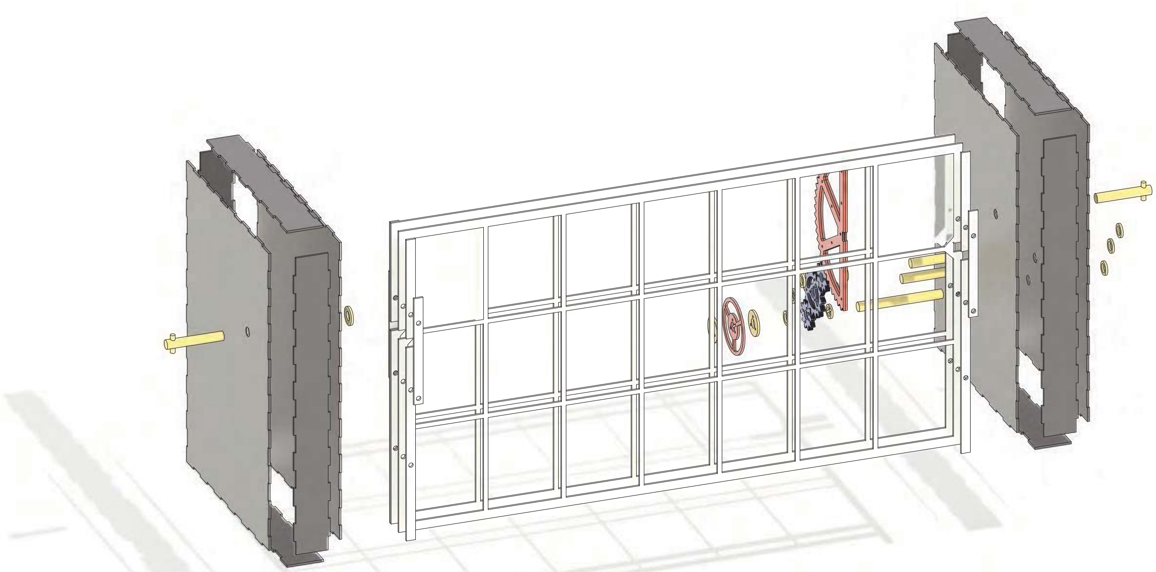

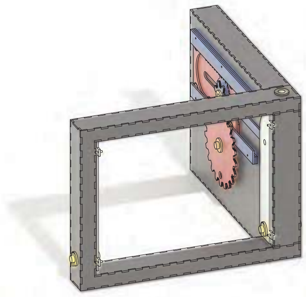

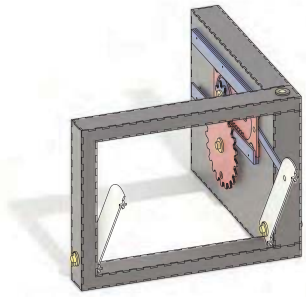

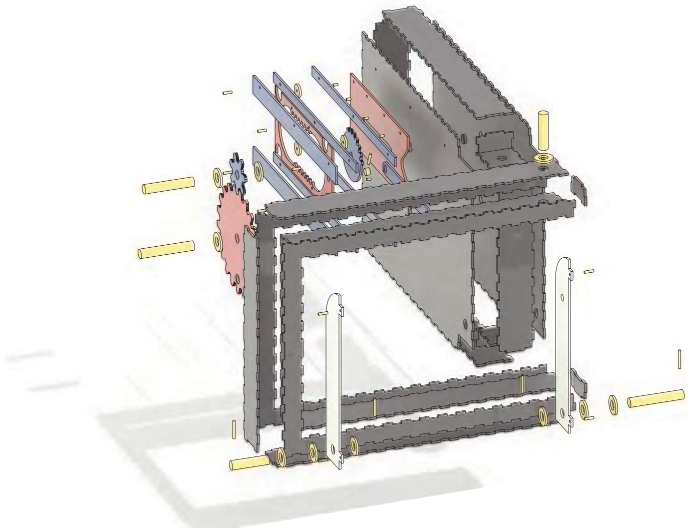

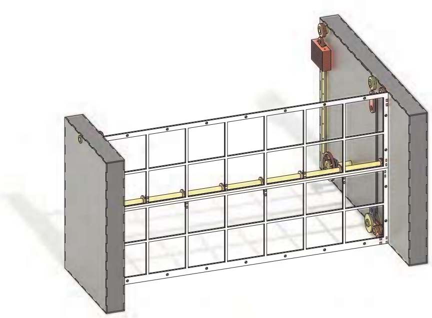

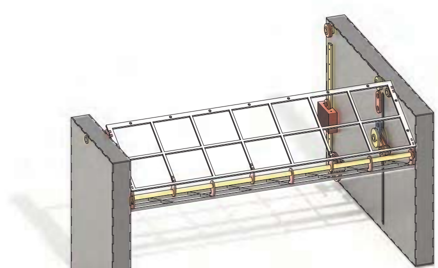

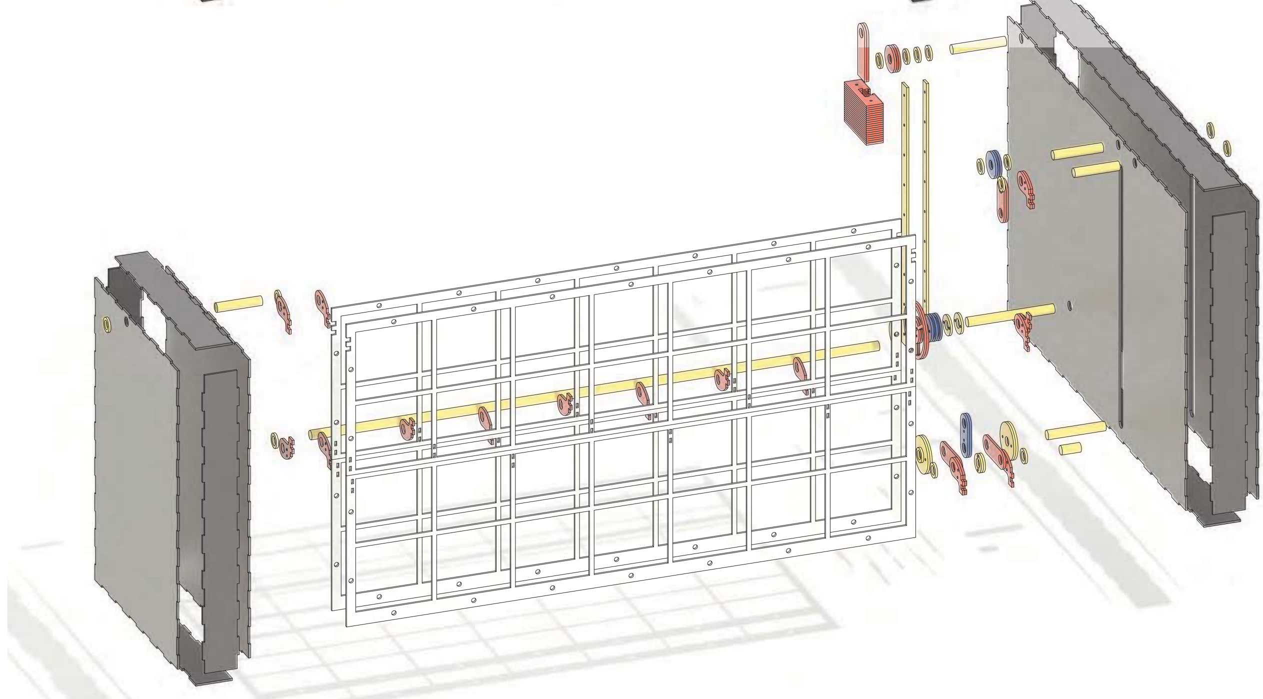

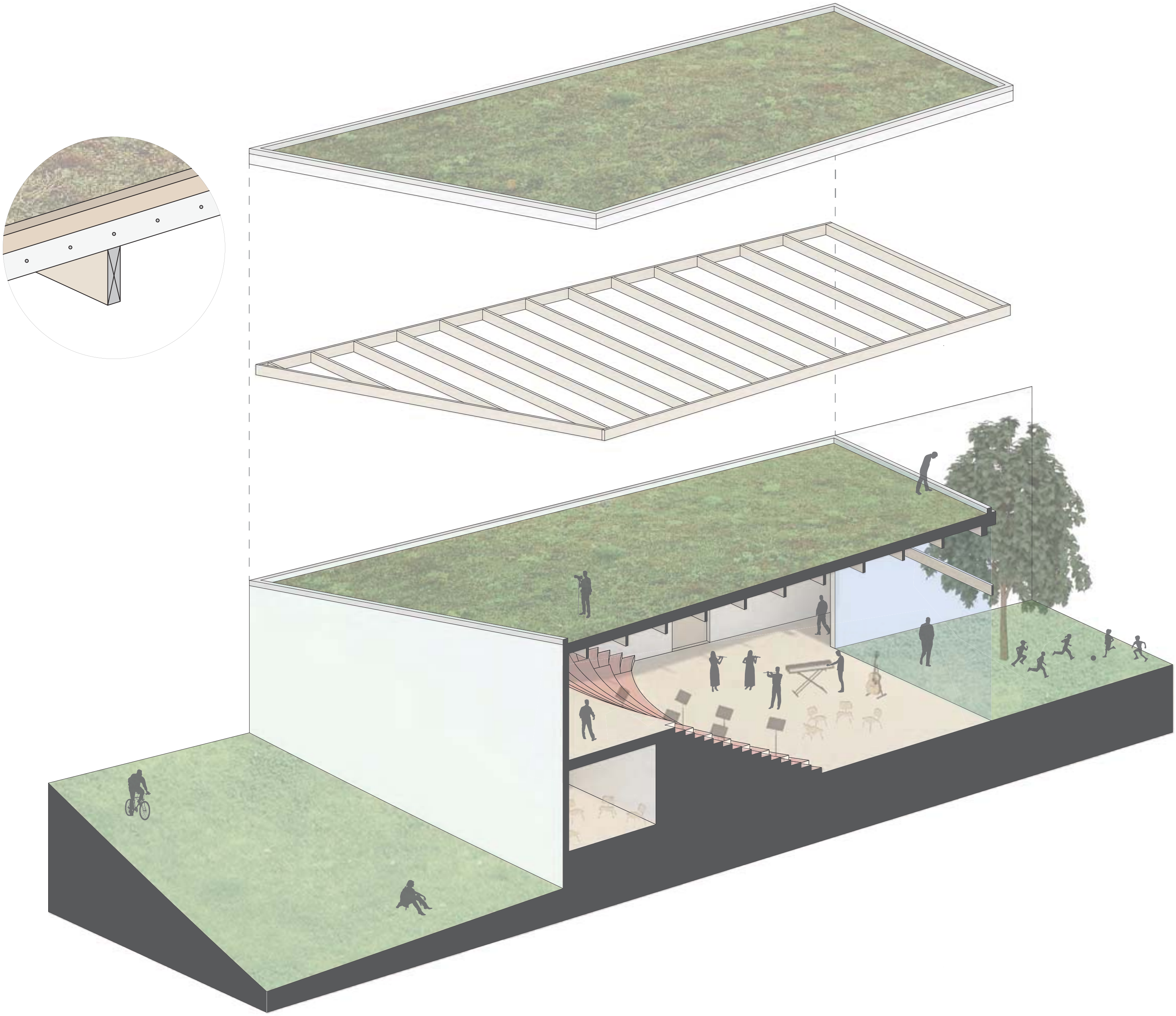

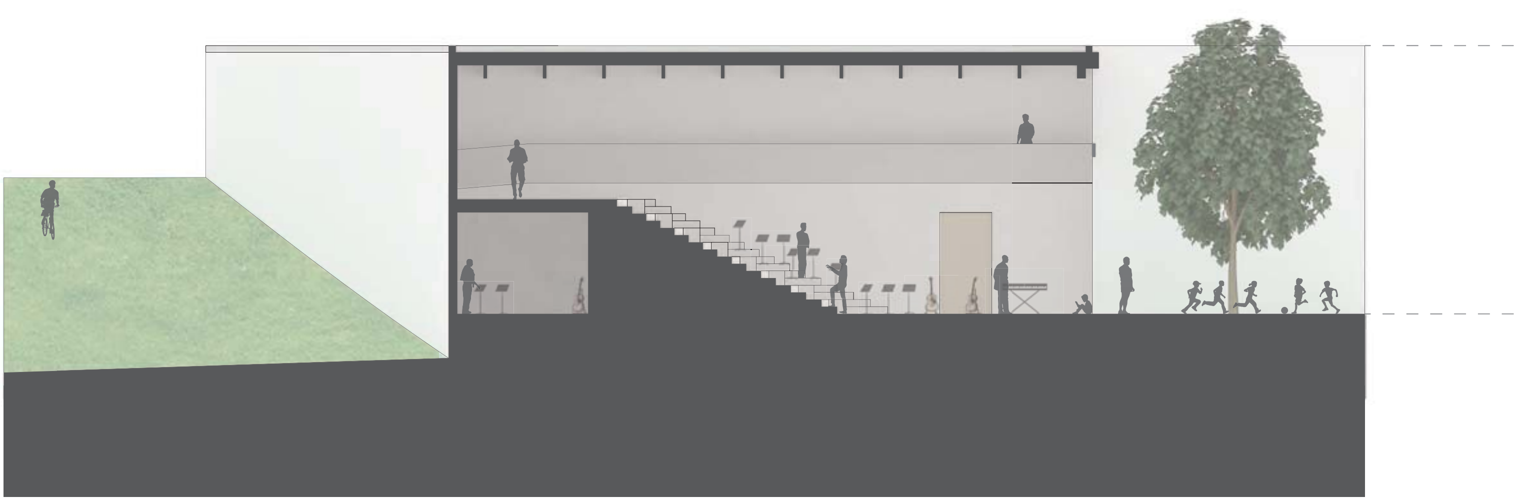

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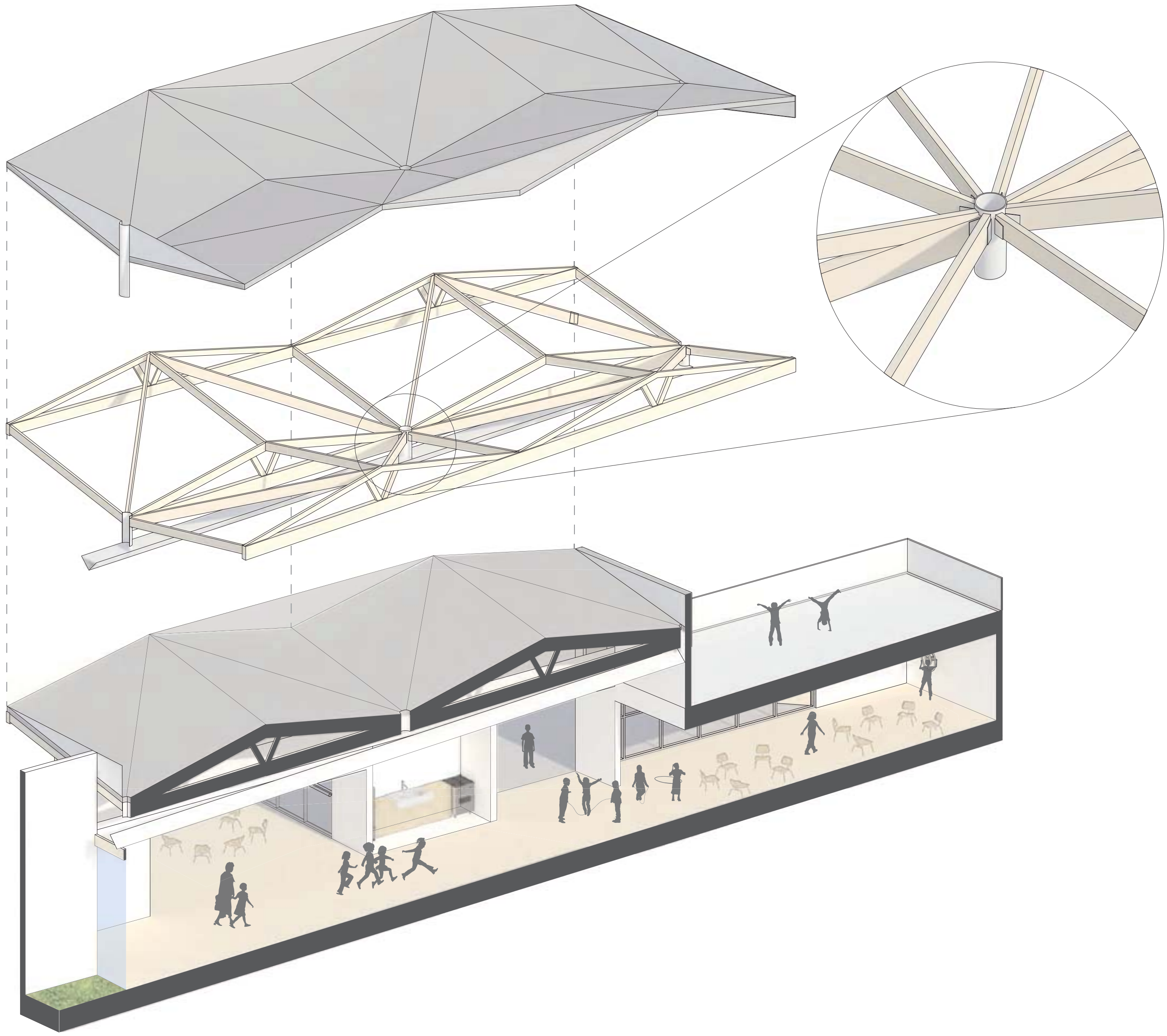

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Constructing Education

Operable Partitions