Destroy Your School:
Building with Kids to Reimagine Learning

by

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ABSTRACT

Too often, our education is disconnected from the physical space in which we learn. Lessons plans and curricula disregard the spatial and physical spaces that define the educational experience. The disciplinary gap between architectural and educational discourse is in need of attention, and bridging this gap is at the heart of my thesis.

I seek to discern methods to better equip our youth for the future. Questions of how and where we learn and share knowledge are crucial to the formation of values in the next generation. Our current moment necessitates extensive collective change and a thorough reconsideration of the values embedded in our systems of education.

How does our built environment inform our learning experience? How does pedagogy shape our world, and how in turn is our world shaped by pedagogy? How can notions of care and stewardship be generated by pedagogy? How can a shift in pedagogy shape classrooms, schools, and neighborhoods? This thesis approaches these questions through the under-considered and often-forgotten problem of middle school age education. The project examines and puts forward a new pedagogy that aims to instill architectural values of collaboration, community, mentorship, interdisciplinarity, improvisation, and material opportunism through education in order to shape the fabric of our society.

The three years of middle school play an enormous role in shaping the next generation. At this critical point, students transition out of learning through play, inquiry, and experimentation to learning as adults in a results-based, structured, and standardized fashion. Introducing a design-build pedagogy into the middle school curriculum becomes not only an opportunity to build a greater sense of autonomy for young learners by elevating students' existing skills embedded in play and experimentation, but a chance to disrupt the general assumptions we grow up with about our built environment. The design pedagogy I propose gives young adolescents a new set of tools to participate and take action in shaping their education, classroom, and community.

At its core, this project aims to enable young learners to find agency and empowerment through their built environment. With the reimagined classroom as site, this thesis advocates for a porous community-wide system of learning and engagement.

Thesis Supervisor: Carrie Norman
Title: Assistant Professor of Architecture

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All images and text by the author,
unless otherwise stated.

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On Play

From a young age, as we confront our social and physical relationships with our surroundings, we test the limits to carve out a language of sorts, of how to interact with our built environment.

These acts appear as play, an instinctual and often flow-like state of testing and reassessing our boundaries.

Play is the best tool we have for learning as a child. It facilitates a deeper understanding of things we aren't directly taught.

As adults, the learning process becomes confined into results-based methodologies, textbooks, abstract questions and indirect learning methods. We are told when and how to experiment and iterate.

The creative act of play is left at the door and we are meant to perform a so-called "higher level" of creative work.

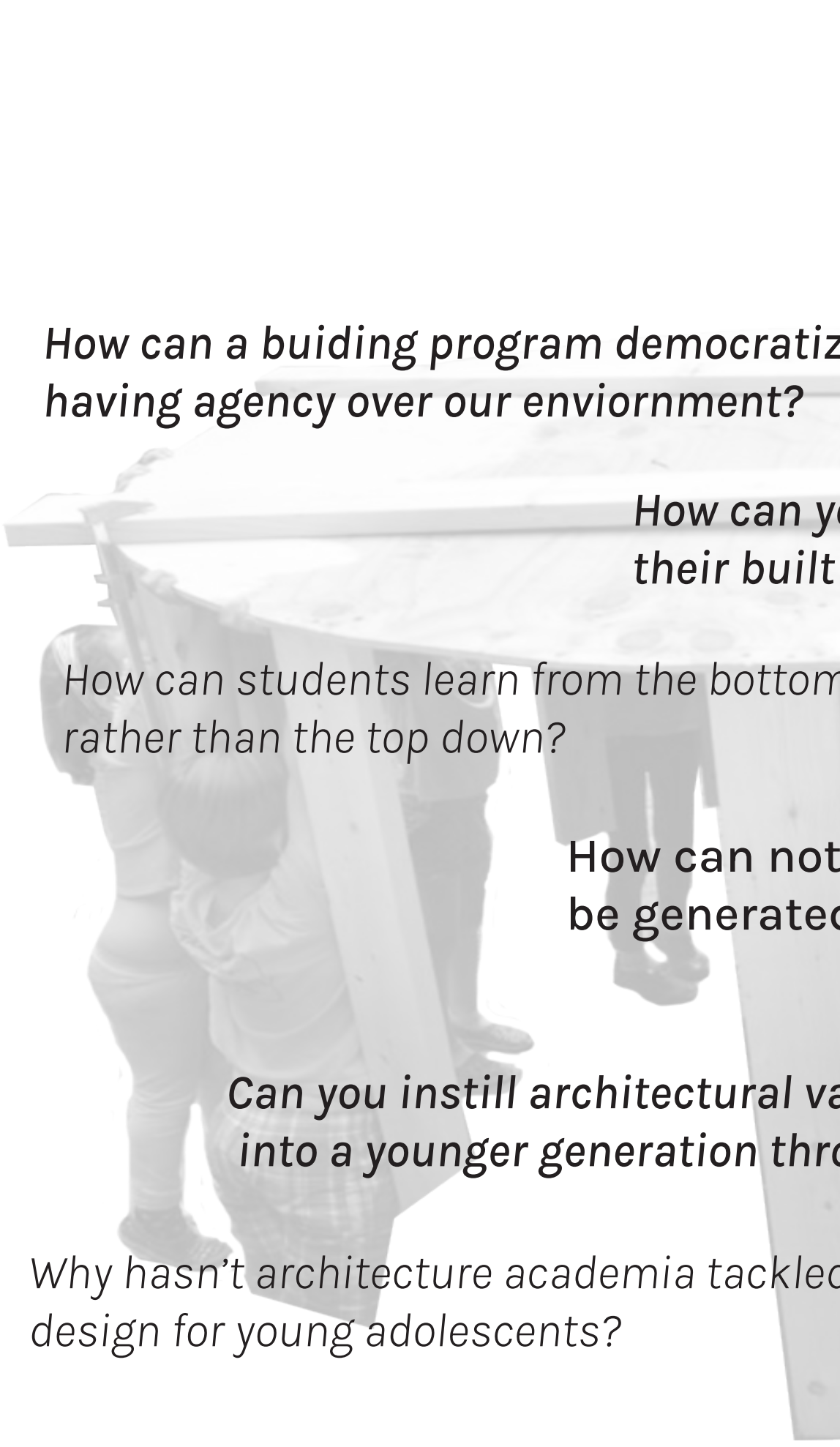
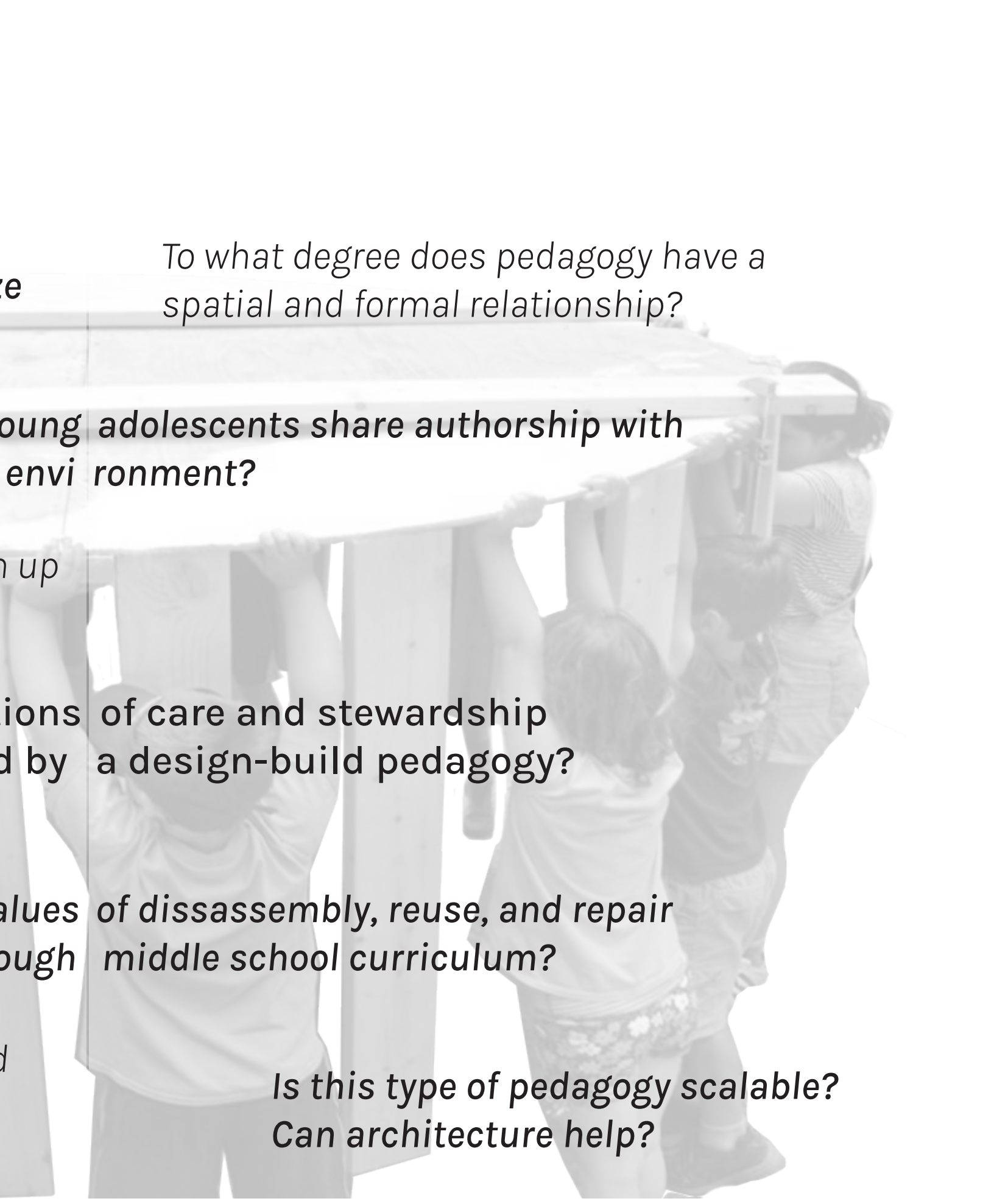


Figure 1
Collage of questions at the heart of this thesis that bridge education and architecture studies. Courtesy Eddie Merma.



To what degree does pedagogy have a spatial and formal relationship?

oung adolescents share authorship with envi ronment?

n up

tions of care and stewardship d by a design-build pedagogy?

alues of dissassembly, reuse, and repair ough middle school curriculum?

d

Is this type of pedagogy scalable? Can architecture help?

Introduction

Questions of how and where we learn, and how learning interacts with play fascinate me. After years teaching museum and art education in various contexts, I spent the last three and a half years in both architecture and education classes grappling with questions of how we build and share knowledge within our built environment, with a special focus on play.

Several questions kept reappearing in my work:

How can notions of care and stewardship of
our built environment be generated by pedagogy?

How can young adolescents share authorship of
their built environment?

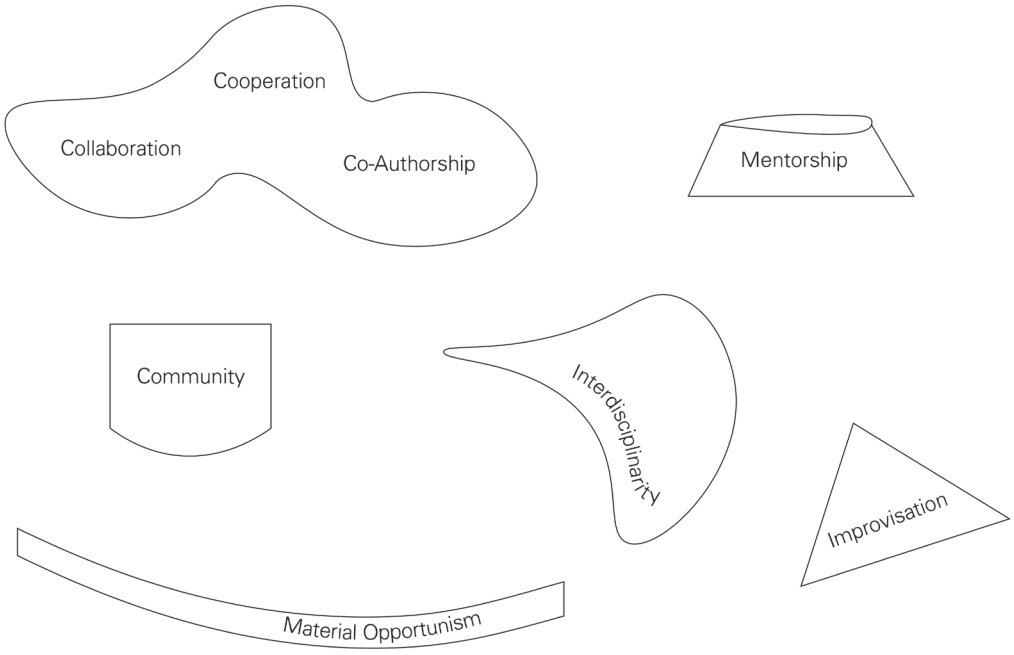
How can both architects and educators better
equip our youth for the future?

Questions of how and where we learn and share knowledge are crucial to the formation of values in the next generation. Our current moment necessitates extensive collective change and a thorough reconsideration of the values embedded in our systems of education.

This thesis approaches these questions through the under-considered and often-forgotten problem of middle school age education.

THESIS PROPOSITION

To develop a pedagogy that harnesses the creativity and problem solving skills of young adolescents and empowers them to be active stewards, builders, and transformers of their built environment, thereby benefiting students, schools, and their communities.



This thesis puts forward a program that occupies a subject block in middle school education just like language arts, math, gym, natural science, and social studies, fitting both into the curriculum of existing middle schools and spatially into existing buildings.

The new middle school pedagogy I propose aims to instill a**rchitectural values of collaboration, community, mentorship, interdisciplinarity, improvisation, and material opportunism** through education. The program both responds to the reality of our educational system today, as well as the material realities of our built environment and materials economy. These six values position the theoretical framework of this project, ensuring that any lesson, or project is rooted in this value set.

Figure 2
Values embedded in the proposed pedagogy: Collaboration, Cooperation, Co-Authorship, Mentorship, Community, Interdisciplinarity, Material Opportunism, Improvisation.

1 Context

Why Middle School?

Between elementary school and high school, students transition from learning through play and the tools of childhood[1], to learning as adults in a results-based, structured and standardized fashion. They have one foot solidly in the play world, where they have learned to learn, discover and explore, but the schooling system attempts to pull them out and line them up in desks.

This age group at this transition point between childhood and adulthood is vast, messy and complicated. It is moody, hormonal and loud.

Studies show that children of middle school age are at the second most important point of their development. Ages 11-14 are important for value alignment and autonomy-building[2]. Between the ages 1 and 5, brain pathways are formed at an alarming rate, and from 11-14 years old, those pathways are wired[3]. The three year cycle of middle school offers an enormous opportunity in shaping the next generation.

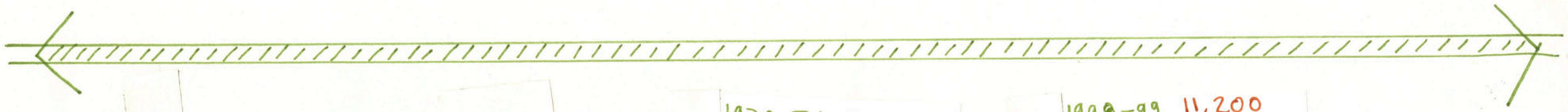
The Middle School Movement

For most of post-industrial education, we have not known what to do with 11 through 14 year olds. Middle school is quite a recent invention. In the 1960s, the educator William Alexander[4] recognized the fundamental issue that school was not designed for this age group and considered it a matter of urgency. He advocated for a middle school model with core elements: team teaching, integrated curriculum, innovative scheduling, and student engagement[5], all new at the time. By the 1980s, Alexander was joined in his research and plea for change by Jacquelyne Eccles who fueled the Middle School Movement by calling attention to the "poor stage-environment fit,"[6] referring to a mismatch between "how well the learning environment fits the developmental stages of students." And the response was huge. From 1970 to 1999, middle schools in the United States grew by 430% from 2100 to 11,200 schools[7].

The early 90s were the middle school heyday and featured heavily in our cultural zeitgeist in film and television. At that time, educators and scholars focused their attention on the specific needs of young adolescents. However, very quickly, by the end of the millennium, policy makers shifted their attention to early childhood education and the transition to college, leaving middle school behind as the proverbial "middle child." The Middle School Movement's goals for middle school education never came to pass, leaving a proliferation of middle schools in need of attention.

1 Brimberg, Stan. "The Fall and Rise of the 8th Grade School." *Bank Street School for Children*, www.school.bankstreet.edu/about/our-approach/progressive-education-rooted-in-tradition/the-fall-and-rise-of-the-8th-grade-school/.
2 Wong, Alia. "Why Is Middle School So Hard for So Many People?" *The Atlantic,* 7 Oct. 2019, www.theatlantic.com/education/archive/2019/10/why-middle-school-and-preteens-are-so-challenging/599542/.
3 Field, Kelly. "What Science Tells Us about Improving Middle School." *PBS News Hour*, 6 Aug. 2011, www.pbs.org/newshour/education/what-science-tells-us-about-improving-middle-school.
4 Ibid.
5 Schaefer, Mary Beth, Kathleen F. Malu & Bogum Yoon. "An Historical Overview of the Middle School Movement, 1963-2015." *RMLE Online*, 13 Apr. 2016, 39:5, DOI:10.1080/19404476.2016.1165036.
6 Field, Kelly. "What Science Tells Us about Improving Middle School." *PBS News Hour*, 6 Aug. 2011, www.pbs.org/newshour/education/what-science-tells-us-about-improving-middle-school.
7 Tamer, Mary. "Do Middle Schools Make Sense?" *Harvard Graduate School of Education Ed. Magazine*, 5 Sept. 2012, www.gse.harvard.edu/ideas/ed-magazine/12/09/do-middle-schools-make-sense.

TIMELINE



Until early 20th century

K-8 is industry standard

1950s

- Reformers launch a movement around middle school
- In response to growing enrollment → JUNIOR HIGHS

1954

Brown vs. Board of Education

1960s

- Middle schools created to accomodate demands for racial desegregation w/o having to desegregate elementary schools

- William Alexander calls for replacing junior highs with middle schools

FATHER OF THE MIDDLE SCHOOL MOVEMENT

1963

Alexander delivers keynote address "The Dynamic Junior High School" at the Junior High Project at Cornell calling for middle schools

1966

Alexander awarded federal funds for a National Defense Education Act Middle School Institute
1969 write the Emergent Middle School
1968 Survey of Org Patterns of Reorganized MSs

1970-71 2100 MIDDLE SCHOOLS

1980s

- "Middle school Movement" gains steam because of Jacqualyne Eccles' "poor stage-environment fit"

- More middle schools appeared in NE + Midwest due to changing demographics HSs were under-enrolled + elementary schools were growing → reorganization to middle schools

- concepts emerge "interdisciplinary team teaching" "cooperative learning" "block scheduling" "advisory programs"

1980s + 90s

Educator turned their attention to the specific needs of young adolescents

1990s

Policymakers' attention shifts to early childhood education + transition to college, leaving middle school as the PROVERBIAL MIDDLE CHILD

1998-99 11,200 (430% MIDDLE SCHOOLS

2018

BOSTON ENDS stand-alone middle schools

Figure 3
Moments in Middle School history.

Theoretical Grounding

This thesis builds off of pedagogical theories to fill in the gaps of our current models of education in order to land somewhere new. It relies on understanding intrinsic motivation, the zone of proximal development, self-directed learning, and inquiry-based and project-based learning, all priorities for current K-12 teaching in order to use school as a tool for agency.

DEPARTMENT OF CARE

Transdisciplinary designer and public architect Justin Garrett Moore and design and architecture critic Alexandra Lange propose that neighborhoods, and the communities that inhabit them, should have dedicated "Departments of Care"[8] staffed by local teenagers. Moore's proposal, which is to do more than maintain our built environment, but task young teens to care for it, was expanded by Lange and her research on teen girls and their loss of dedicated spaces in our current society[9].

PLAY AS A CENTRAL TENET

Richard Sennett, in his 2012 book, *Together: The Rituals, Pleasures, and Politics of Cooperation*, and related lecture "The Architecture of Cooperation," defines cooperation as a skill that's developed, not innate[10]. He equates both craft and cooperation, to understand how skills that we use to deal with our material world translate into skills that we use to deal with one another. Sennett talks about the importance of establishing ground rules, rituals and conventions in order to cooperate with each other[11]. These skills are learned. And often learned through play.

8 Lange, Alexandra. "What It Means to Design a Space for 'Care'." *Bloomberg*, 4 Nov. 2021, www.bloomberg.com/news/features/2021-11-04/what-care-means-in-design-planning-and-architecture.
9 Lange, Alexandra. "Teen Girls Need Better Public Spaces to Hang Out." *Bloomberg*, 28 May 2021, www.bloomberg.com/news/features/2021-05-28/we-need-more-public-space-for-teen-girls.
10 Sennett, Richard. "The Architecture of Cooperation." *Harvard Graduate School of Design*, Feb. 2012, www.youtube.com/watch?v=tcXE4NEgLn8.
11 Ibid.

Legacy of Experimental Education

This project connects to a lineage of both architectural and experimental education. I studied approaches and exercises from architectural studios from the 1960s, as well as previous and current pedagogical methods in K-12 education. Influential models in experimental architecture studio education include the Jersey Devil design-build courses, Lawrence and Anna Halprin "Experiments in Environment" workshops, and Sim Van Der Ryn and Jim Campe's "Outlaw Builders' Studio".

Figure 4
"Ritual Group Drawing," Sea Ranch, CA. Experiments in Environment Workshop, July 8, 1968. Courtesy Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania.

Figure 5
Student-built geostix dome with parachute cover, Odyssey school experiment, Castro Valley, California, 1970. Courtesy James Campe.

As Reference:
Current Experimental Maker Programs

USA

ASSEMBLY 150 (SACRA)
Buffalo, NY

BRIGHTWORKS SCHOOL
San Francisco, CA

DOWNCITY DESIGN
Providence, RI

MOBILE MAKERS
Chicago, IL and Boston, MA

NUVU
Cambridge, MA

NO SCHOOL
Interim Location: Berkeley, CA

TERRITORY TEENS
Chicago, IL

TINY WPA, BUILDING HEROES PROGRAM
Philadelphia, PA

UK

MATT + FIONA
London, UK

STORE
London, UK

2 FURNITURE FOR LEARNING

Sculpture School

This project is inspired and influenced by my experience with middle schoolers who attend a large-scale sculpture building camp in Vermont. Sculpture School, directed by Eddie Merma, is an experimental building camp in the hills of the Mad River Valley. Students spend school-year weekends and summer weekdays engaged in large-scale collaborative building projects. Their environment is filled with past versions of their creations, mined and re-mined each session for ideas and materials for transformation into something new. Sculpture School's pedagogy is inspired by leading institutions in project-based experimental learning such as Brightworks and Tinkering School in San Francisco.

I worked with the program over the Summer and Fall of 2023, and saw first hand how much the environment in which you learn to make influences how you feel about making. At Sculpture School, the walls are covered with tools and the yard is full of materials. Students lead. They are encouraged not to strive for the right method, but to do things wrong first to test out ideas. To that effect, screws are often redundant, angles are not consistent, and yet, the students create stable, strong, and of course risky, but highly inventive and exciting projects.

Figure 6
The outdoor workspace at Sculpture School in Waitsfield, VT in July 2023.

Figure 7
A young student using the chop saw to cut wood at Sculpture School in July 2023.

Figure 8
A 10-year old student giving a jigsaw tool demonstration at Sculpture School in July 2023.

Workshop: Furniture for Learning

In November 2023, I organized a workshop with seven 11, 12, and 13 year olds around learning and the architecture that supports it. I focused on a scale that was workable for all students, the scale of furniture.

I asked the students: Where does learning happen? According to Noah, who just turned 12, learning happens everywhere. It is in the small and big moments of discovery. If learning can happen anywhere, we also thought about what activities enable it. Especially, what activities commonly seen in a regular school environment as antithetical to learning can actually create fruitful spaces for learning? Are you learning when you're lost in thought, staring into space, chatting with a classmate?

Prompts as Probes

With these questions, we set out to rethink what "furniture for learning" could be. As an architecture student, I know how important the balance is between constraints and open-endedness in order to arrive at new ideas. The pedagogy of the workshop, and that of the wider program I propose, relies on teetering between the two. We used prompts to provide the framework to balance between the pragmatic: constraints or parameters, and the open-ended: ideas and possibility. I provided students with prompts to kick start their imagination. But in the classroom, this task would be generative.

The prompts were direct yet open-ended, meant to be interpreted in multiple ways and to be molded into the desire of the student. The red category was based in tectonics: "its top must be larger than its bottom," "it wobbles." The yellows were qualifiers: "for daydreaming," "for someone who loves to read."Or, more succinctly, as Zoe, the youngest in the class put it on first glance, the red ones define the object, and the yellow ones define the activity or person using it.

Prompts are analogous to what architects do. Architects have a learned ability to define conceptual meaning and extract physical tangible manifestations of that concept. The prompts, just like our design briefs, do the legwork of establishing something to work off of, in order to open up the playing field for imagination. They act as entry points into abstract questions, or in educational terms, as tools that bring the learner into the zone of proximal development (ZPD)[12]. It only takes something small to trigger big ideas. The students do most of the heavy lifting with their own imagination.

12 Kurt, Serhat. "Vygotsky's Zone of Proximal Development and Scaffolding." *Educational Technology*, 11 July 2020, www.educationaltechnology.net/vygotskys-zone-of-proximal-development-and-scaffolding/.

Figure 9
Examples of prompts from the "Furniture for Learning" workshop in November 2023.

Results

After taking time to choose their two prompts, the students sat down together to sketch out ideas for their designs. The prompts generated questions for the students to pose each other, consider, respond to, and regenerate. Through sketching and discussion, the students embarked on a cycle of creation, imagination, and inquiry.

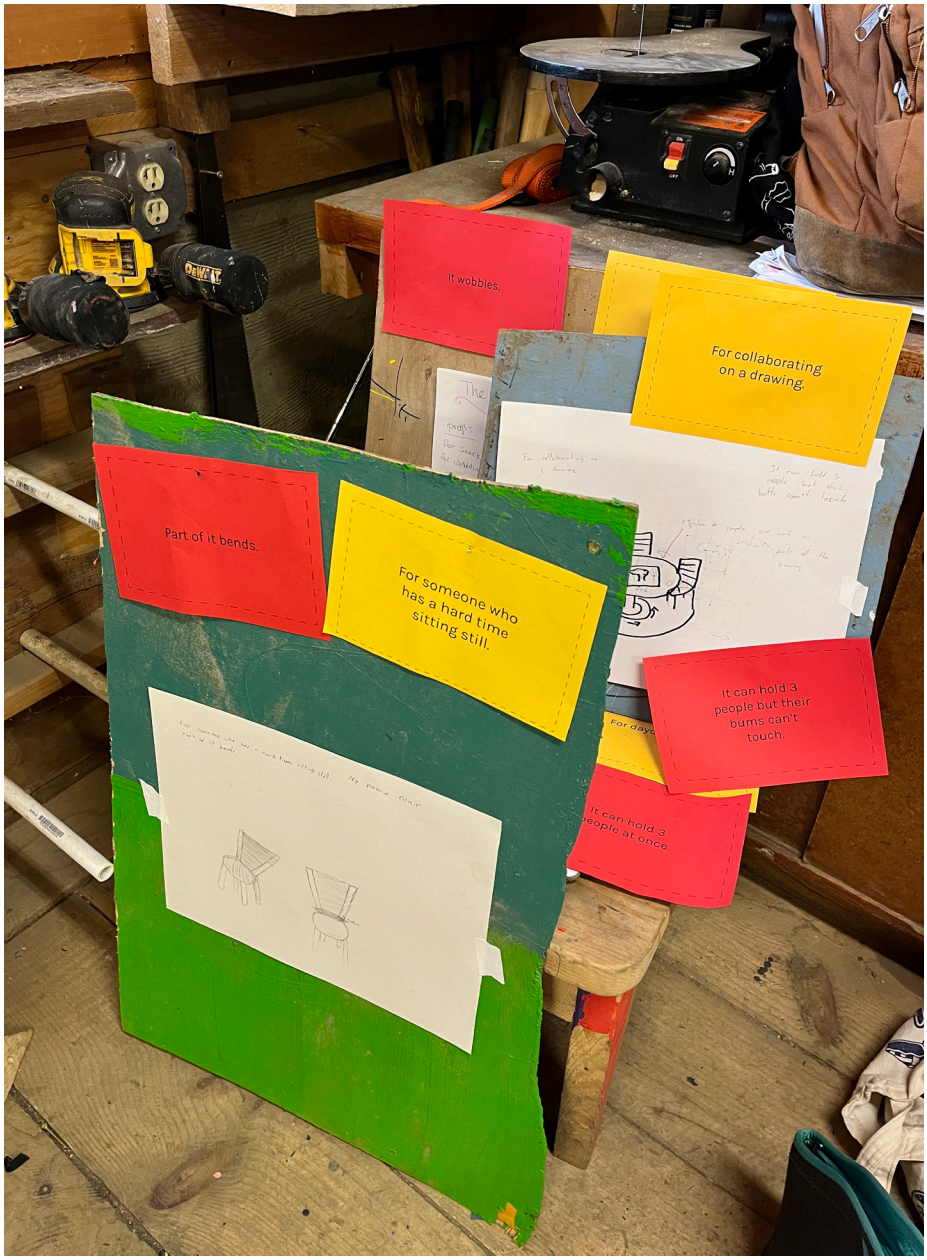


Figure 10
Student sketches from the "Furniture for Learning" workshop at Sculpture School in November 2023.

Figure 11

Figure 11
Prompt boxes from the "Furniture for Learning" workshop (right) and the RFP deck problem (left). Courtesy Andy Ryan.

Figure 12

Figure 13

Figure 14

Figure 12-14
Student participants in the "Furniture for Learning" workshop at Sculpture School in November 2023. Courtesy Eddie Merma.

Figure 15 Courtesy Andy Ryan.

For someone who has a hard time sitting still.

Part of it bends.

Figure 16 Courtesy Andy Ryan.

For collaborating on a drawing.

It can hold 3 people but their bums* can't touch.

*Converted to [butts] by the young builder, Zoe.

Figure 17

For snacking.

It rocks.

Figure 18

For daydreaming.

It can hold 3 people at once.

Figure 19

For a hiding place.

Part of it moves.

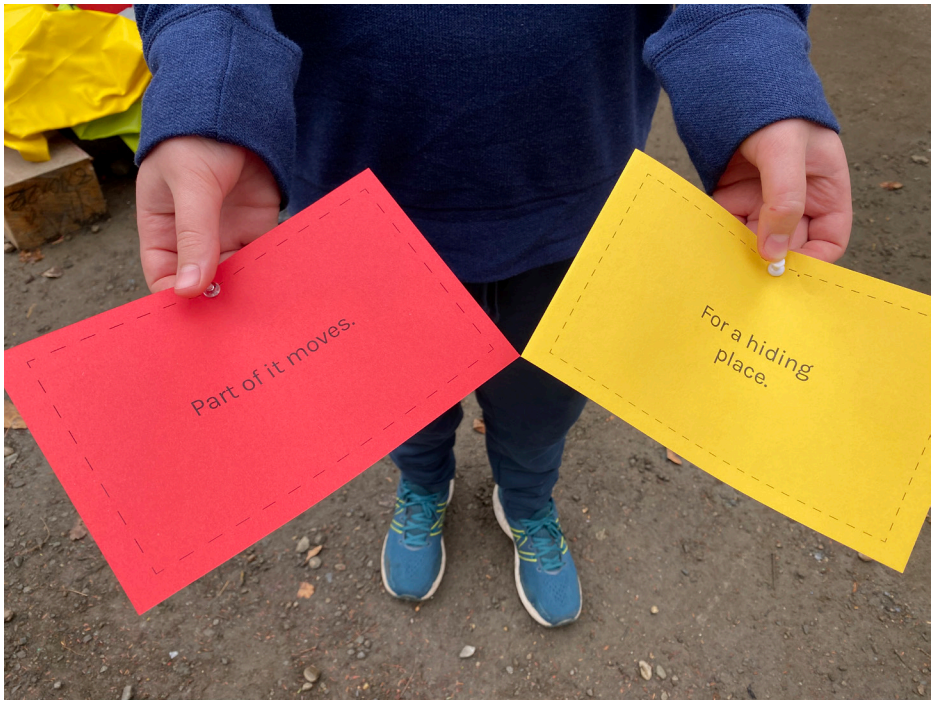


Figure 20

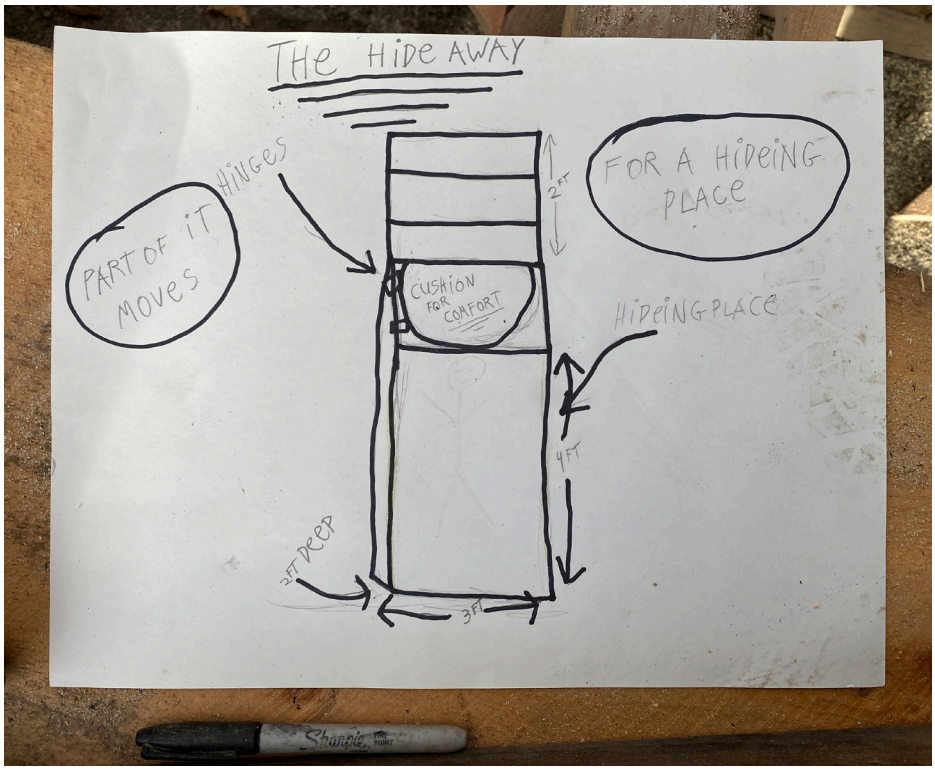


Figure 21

Figure 15-21
Images of the students' work for the "Furniture for Learning" workshop.

DAYDREAMING BENCH by Harris and Sam

Sam and Harris contemplated what it means to daydream. They asked each other: "do you lean back to daydream, are you looking out the window... or at the ceiling? Are you staring into space? Can you stand up to daydream? Do you have to be somewhat relaxed? How much support does your body need?"

Figure 22

They talked it through together, talked about it with others in the group, and had classmates test out their proposals throughout the afternoon. They built the base of a seat first, and then tested it at different angles to understand the best angle of repose for daydreaming.

Figure 23

Figure 22-23
Harris finds the perfect angle for daydremaing during the "Furniture for Learning" workshop at Sculpture School in November 2023.

SNACKING ROCKER by Daisy and Hannah

"How could you use a rocker in a classroom learning situation? Would it be for a fidgeter? Would it be for chatting and spending time with your friends?" Hannah and Daisy asked. They were the oldest girls in the group, just on the cusp of teenagehood. They spoke about wanting a place to hang out within the classroom during free time. In order to make it comfortable, they reached for softer materials.

Figure 24

In a traditional classroom, Daisy and Hannah might have been separated. But, studies show that kids of that age actually learn better when they are paired with friends[13]. Placing friends together in class activities, despite lending itself to more chatting and disruptions, actually increases their understanding and engagement with the material.

12 Field, Kelly. "What Science Tells Us about Improving Middle School." *PBS News Hour*, 6 Aug. 2011, www.pbs.org/newshour/education/what-science-tells-us-about-improving-middle-school.

Figure 25

Figure 24-25
Daisy and Hannah build and test out their "Snacking Rocker" during the "Furniture for Learning" workshop at Sculpture School in November 2023.

COLLABORATIVE DRAWING TABLE by Zoe

Zoe was set on building a table top that could rotate to serve her collaborative drawing table for 3. She first developed a sketch of a possible design before taking a look at the materials we had gathered for the workshop. After the base of an office chair caught her eye, she readjusted her design around the found object.

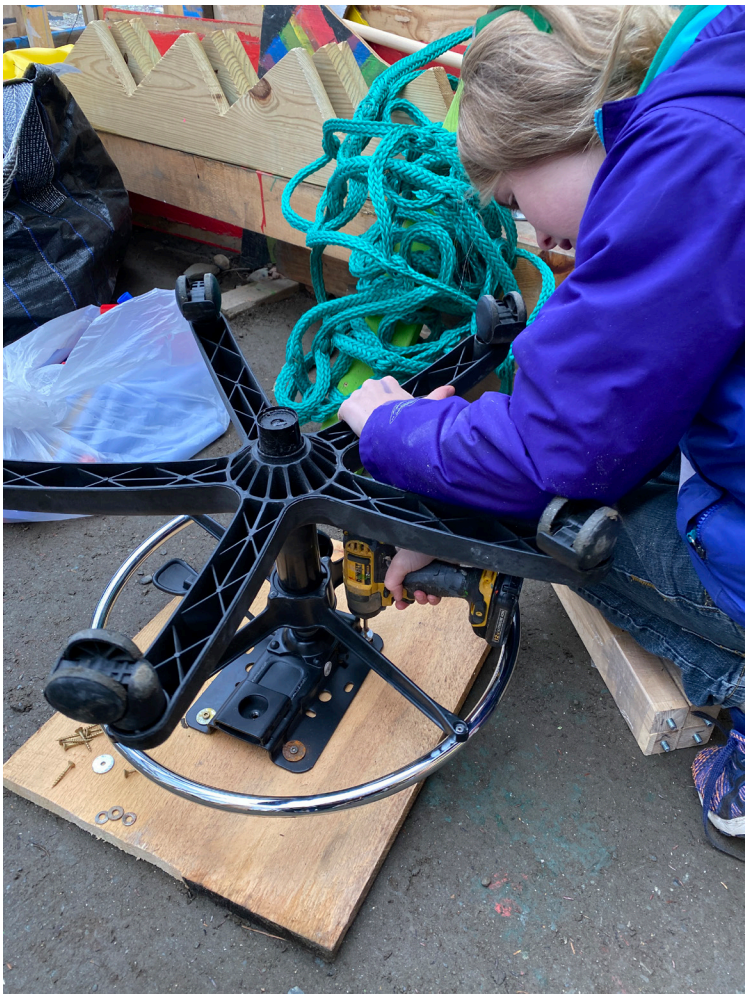


Figure 26

In testing out her design, she realized that rather than simply crafting a table for collaboration, she had uninentionally built a drawing machine. By spinning the table top around while holding a pencil still over an affixed piece of paper, unexpected lines excitingly appear.

Figure 27

Figure 26-27
Zoe building the "Table for collaborative drawing for 3 people whose butts can't touch," during the "Furniture for Learning" workshop at Sculpture School in November 2023.

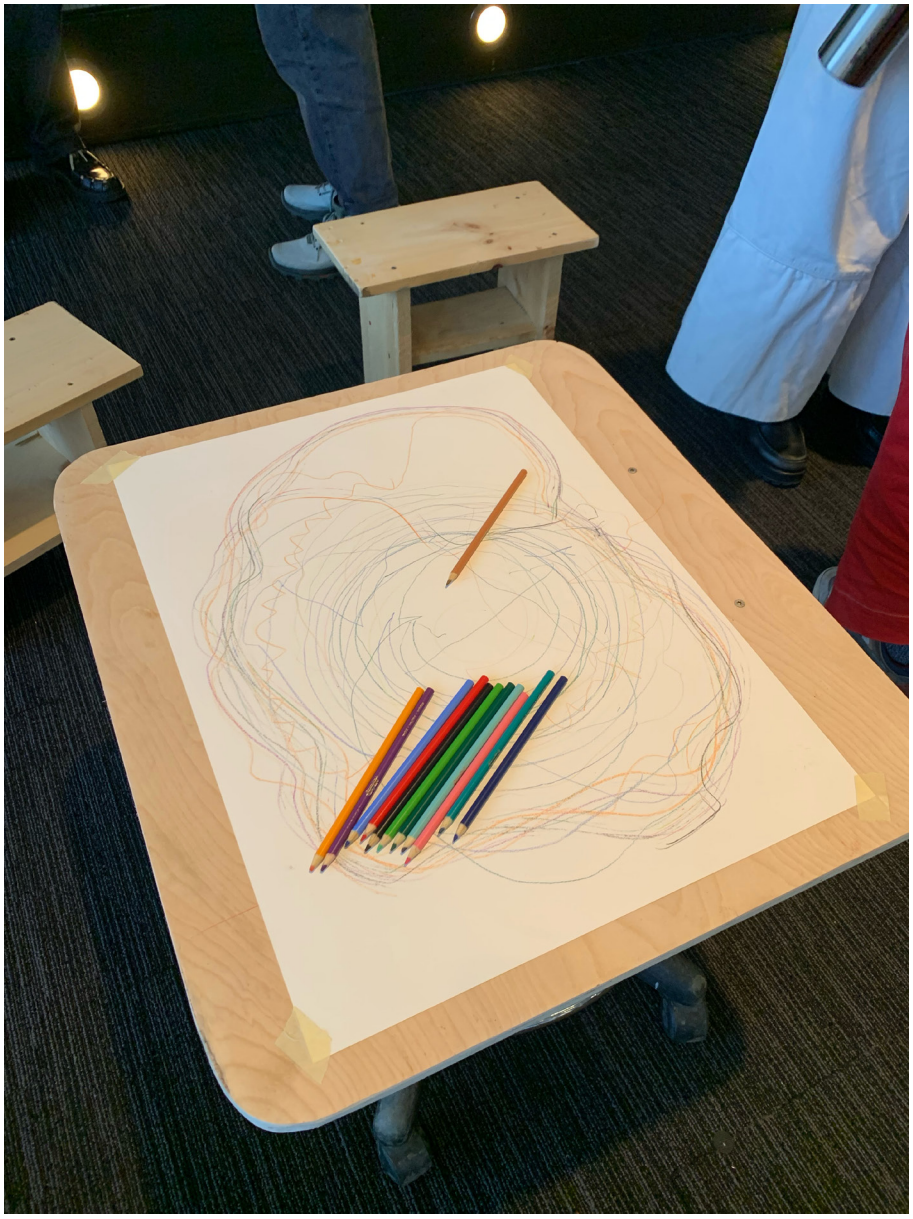


Figure 28
The collaborative drawing table used as a spinning drawing machine by the audience at Final Review.

Reflections

Unexpected problems and situations arose from putting abstract questions and prompts together with the students' imaginaries and the materials available to them over the course of the workshop. They followed leads and went down paths they, nor I, had predicted at the start. Students used improvisation and quick problem-solving to collaborate on full-scale pieces. Wrong turns made for deeper explorations into how "these functional objects we call furniture can do their playful best."[13]

13 Sara Hendren, personal communication, 21 Nov. 2023.

3 SITE

Case Study: Boston Public Schools

Over the Fall I spoke with middle school grade teachers at a Boston Public School in East Boston and visited their classrooms. Boston Public Schools (BPS) recently chose to close all of its middle schools and absorb the three middle grades into elementary and high school programs[14]. The change reflects a similar cunundrum many schools face across the United States where middle school education is not working. Rather than reinvogorate existing programs, school boards across the country, including Boston's own, have chosen to remove investment in their middle schools and close the programs alltogether.

The school I visited had integrated middle school into the top floor of the three-story now K-8 building to give the illusion that middle school was its own sector within the school. They often ran into a problem of middle schoolers pummeling the elementary school children as they barreled down the stairs and out of the school at the end of each day.

The classrooms of this public school are antiquated. The buildings is tired and listless. Teachers complain of not having the right equipment or even enough electric outlets in a classroom. They improvise with furniture and materials, but feel discouraged by their spatial environments. The heating is too hot in the winter, and the air conditioners are few and far between in the summer. They have too little storage space, and students use desks that are inapropriately sized which teachers have to fight each other for each August. The teachers are discouraged as are the students. Yet, they still continue to fill their spaces with joy and decoration, making the most of what they have.

14 Jehlen, Alain. "BuildBPS 10-year plan: Close all middle schools." *Boston Parents Schoolyard News*, 29 Oct. 2018, www.schoolyardnews.com/buildbps-10-year-plan-close-all-middle-schools-ecd4eb5da484.

Classroom as Site

The site for this thesis is the classroom. In education, we speak of the classroom as the third teacher[15]. Students learn from their teachers, their peers, and the third influential force is their environment. There is a reason things are labeled, clearly visible, and teachers cover their walls with decoration made by the students. The classroom is a tool for belonging, acceptance, and discovery. Students learn better and feel better when they see themselves and their actions reflected in their spaces.

So, why not enable students to have a part in crafting their third teacher? This thesis proposes a pedagogy that enables students, beginning in middle school, to act as designers of their environment. 11-14 year olds are constantly mining their world and social relationships for cues, trying desperately to understand how this whole thing works[16]. Their ability to problem solve, and eagerness to understand, provides an opportunity for establishing value sets at this age that stick with them into adulthood. Reading the world to understand their position within it requires tremendous resilience, agility, and open-mindedness, which show up in the questions these students ask and the propositions they put forward.

15 O'Donnell Wicklund Pigozzi and Peterson, and Bruce Mau Design. *The Third Teacher: 79 Ways You Can Use Design to Transform Teaching & Learning*. Abrams, 2010.
16 Arnold, John. "A Curriculum to Empower Young Adolescents." *Annual Meeting of the National Middle School Assocation*, 5-8 Nov. 1992, www.eric.ed.gov/?id=ED361913.

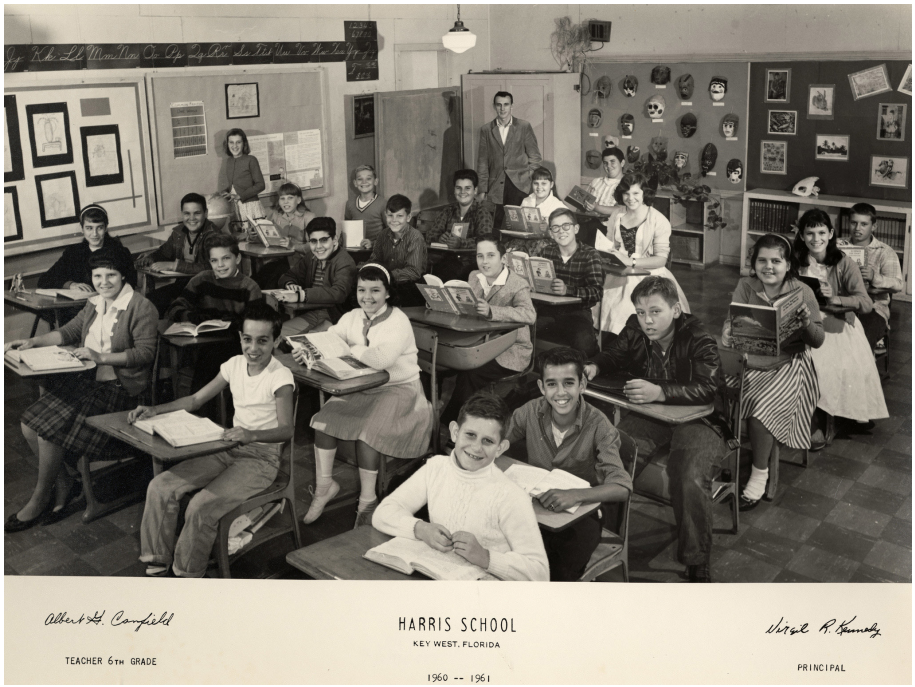


Figure 29
Albert G. Canfield, 6th grade, Harris School 1960-1961. Courtesey Monroe County Public Library Collection. A traditional classroom from the 1960s which does not look too dissimilar from a classroom today.

Figure 30 (right)
A stitched image of a Boston Public School 8th grade science classroom.

Figure 31 (right)
An unfolded elevation and plan drawing of an 8th grade classroom.

Figure 30

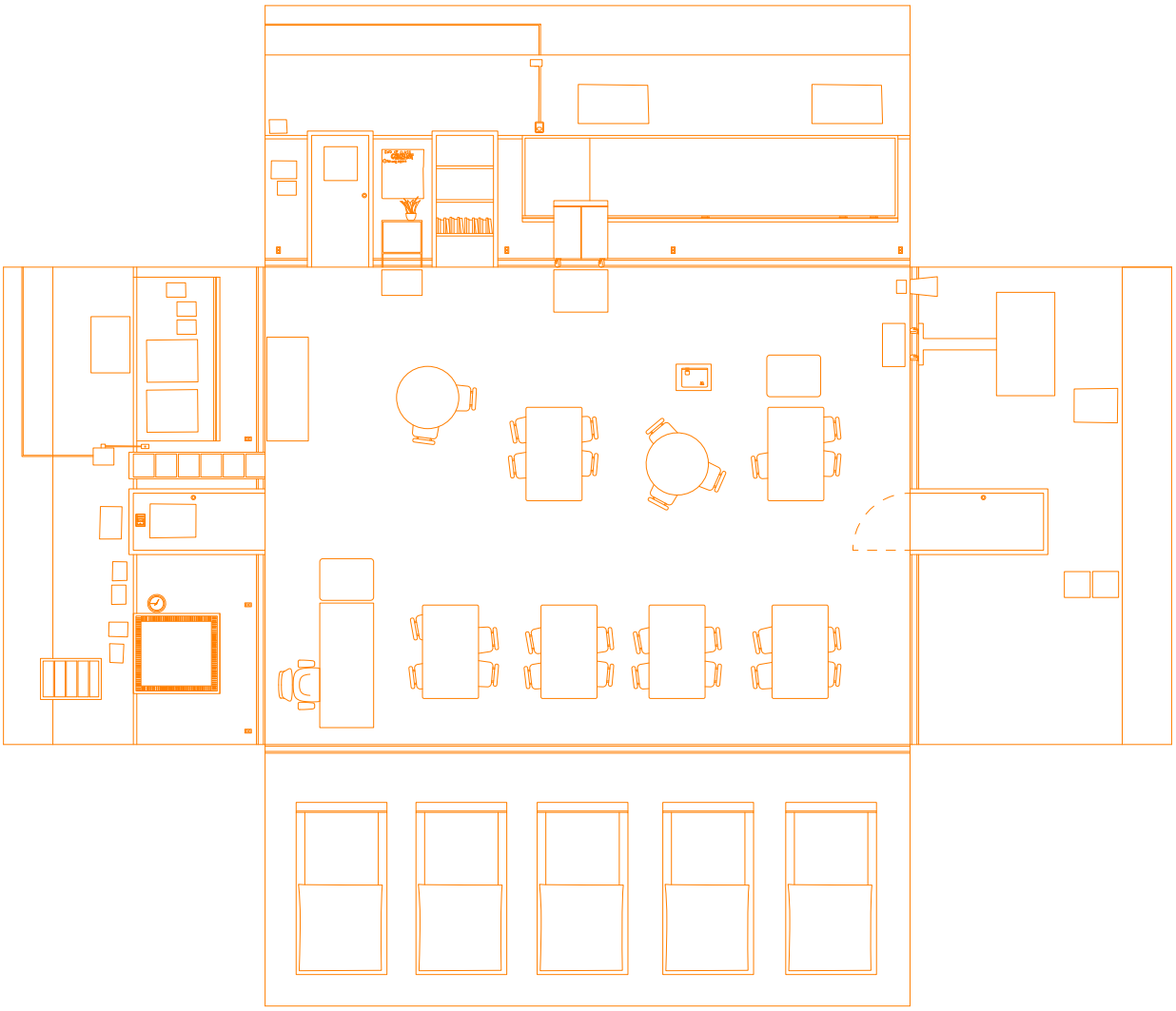
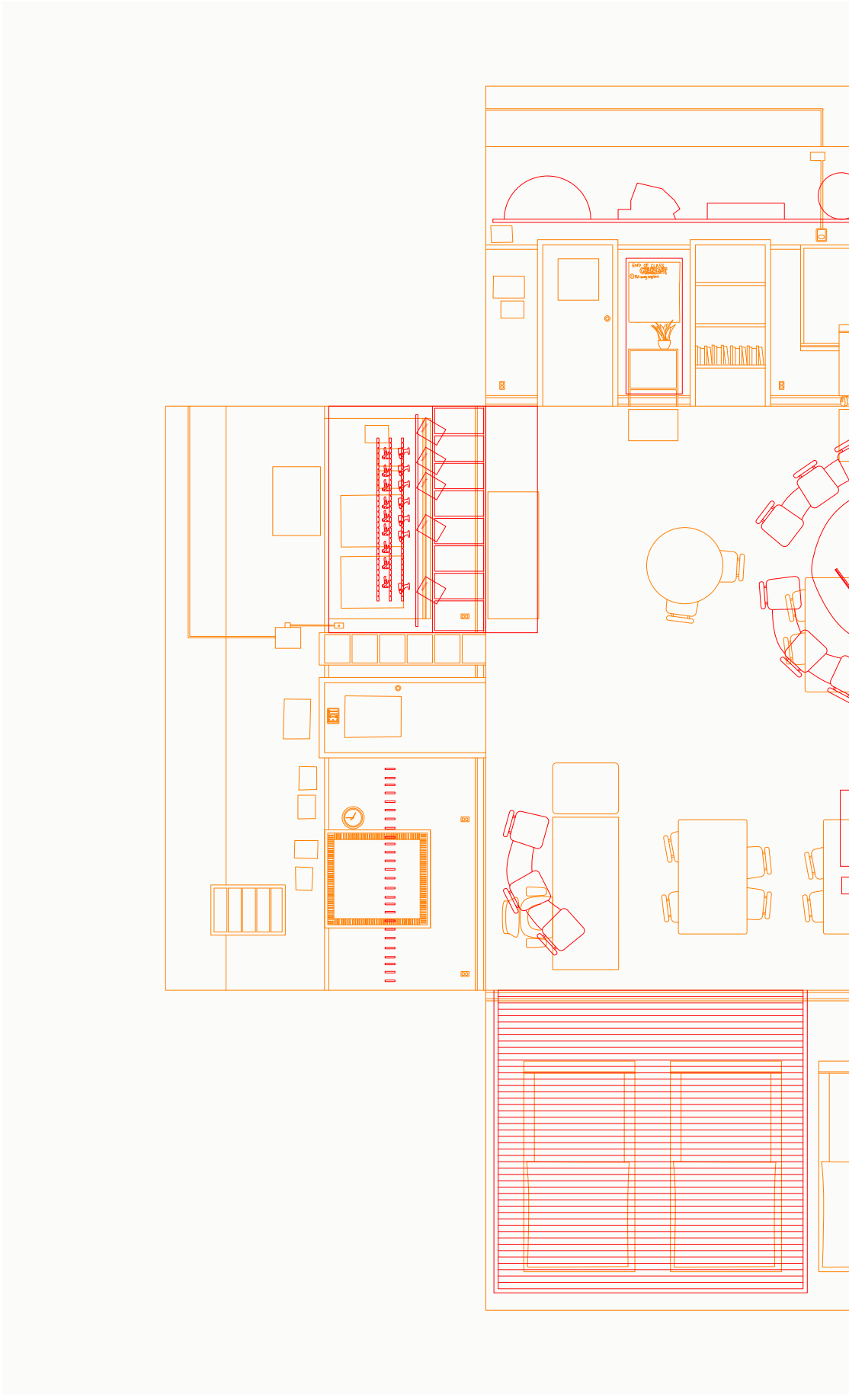
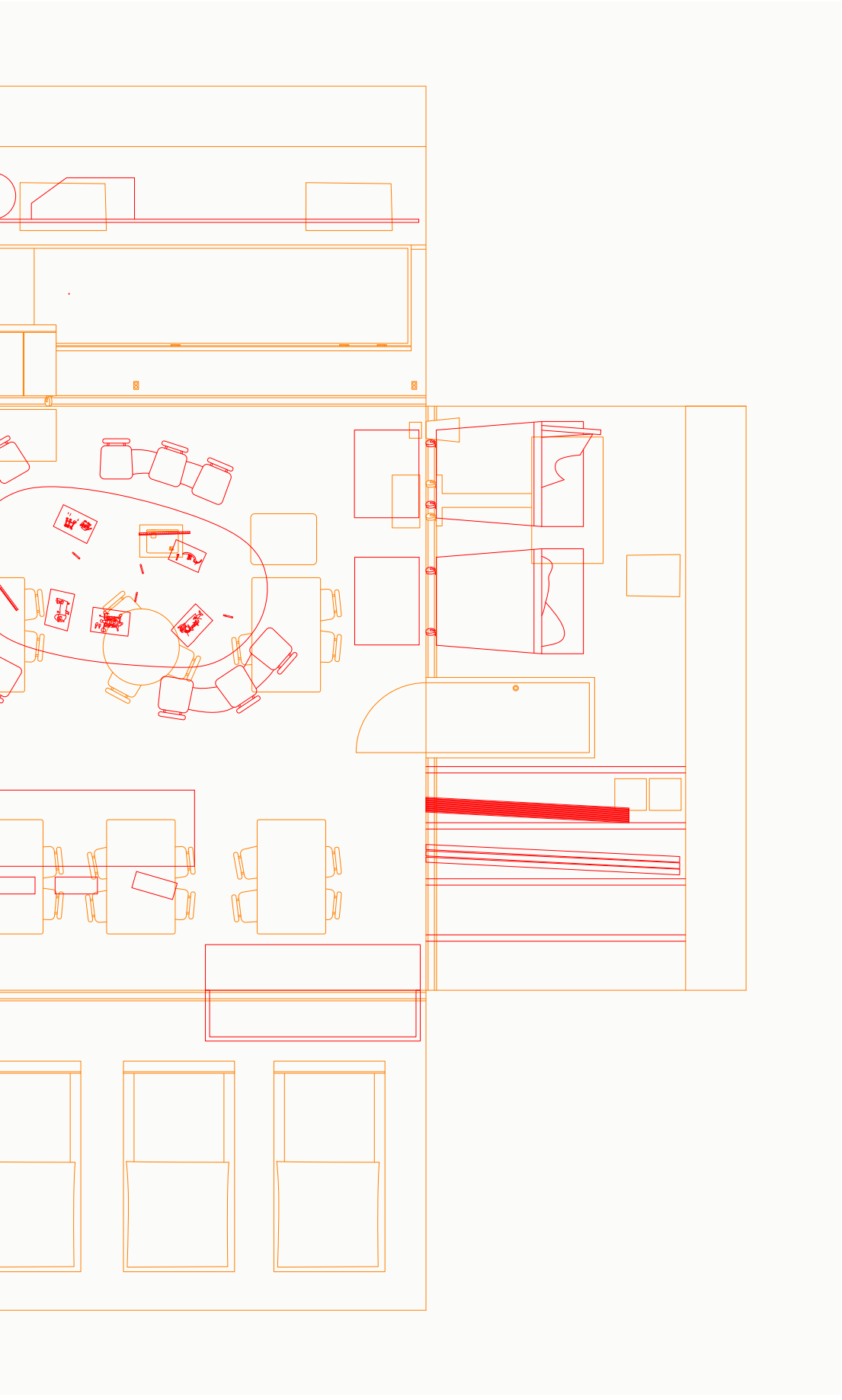


Figure 31

Figure 32
What begins to change when we integrate new forms of pedagogy into existing spaces?





4 PEDAGOGY

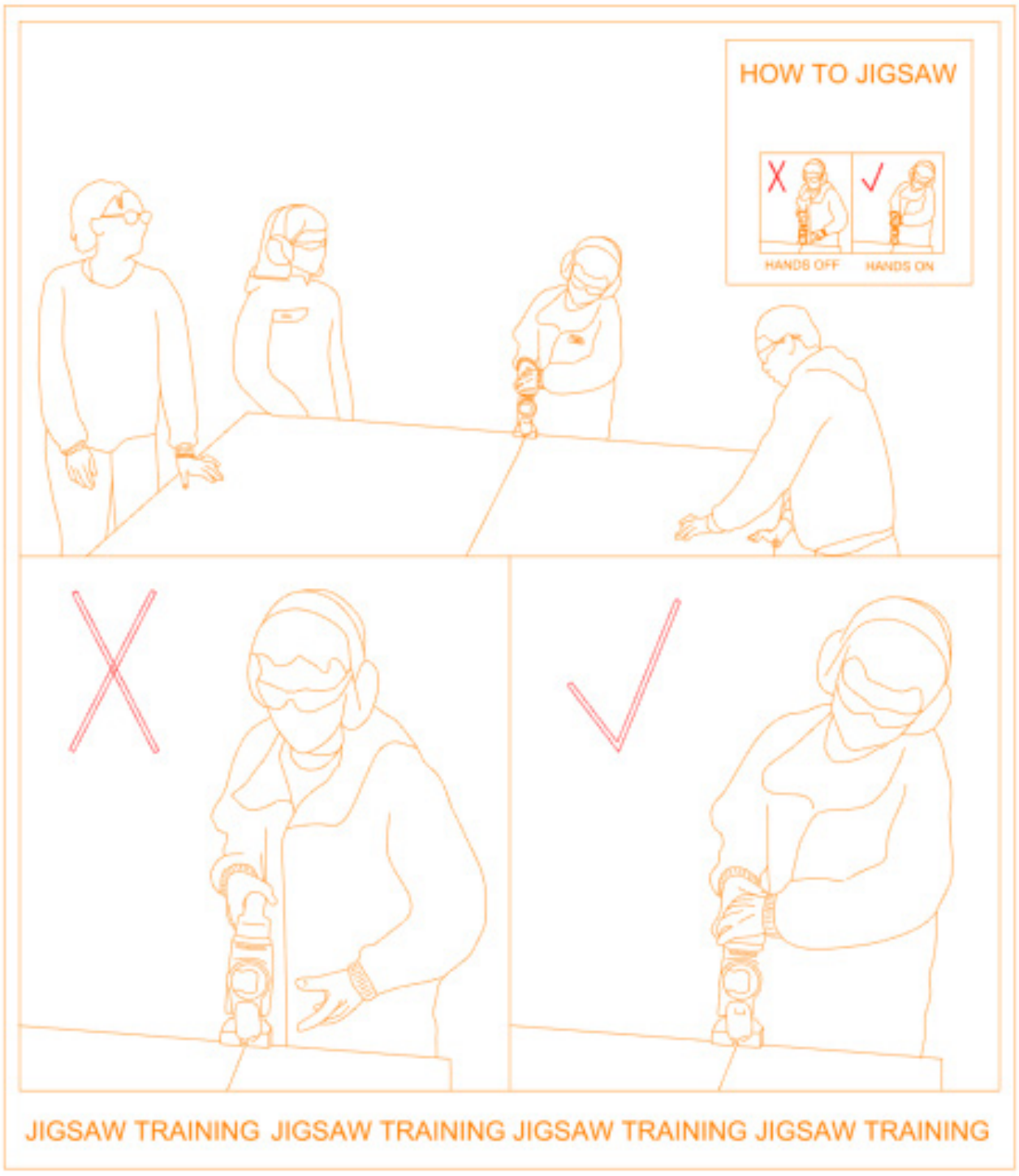
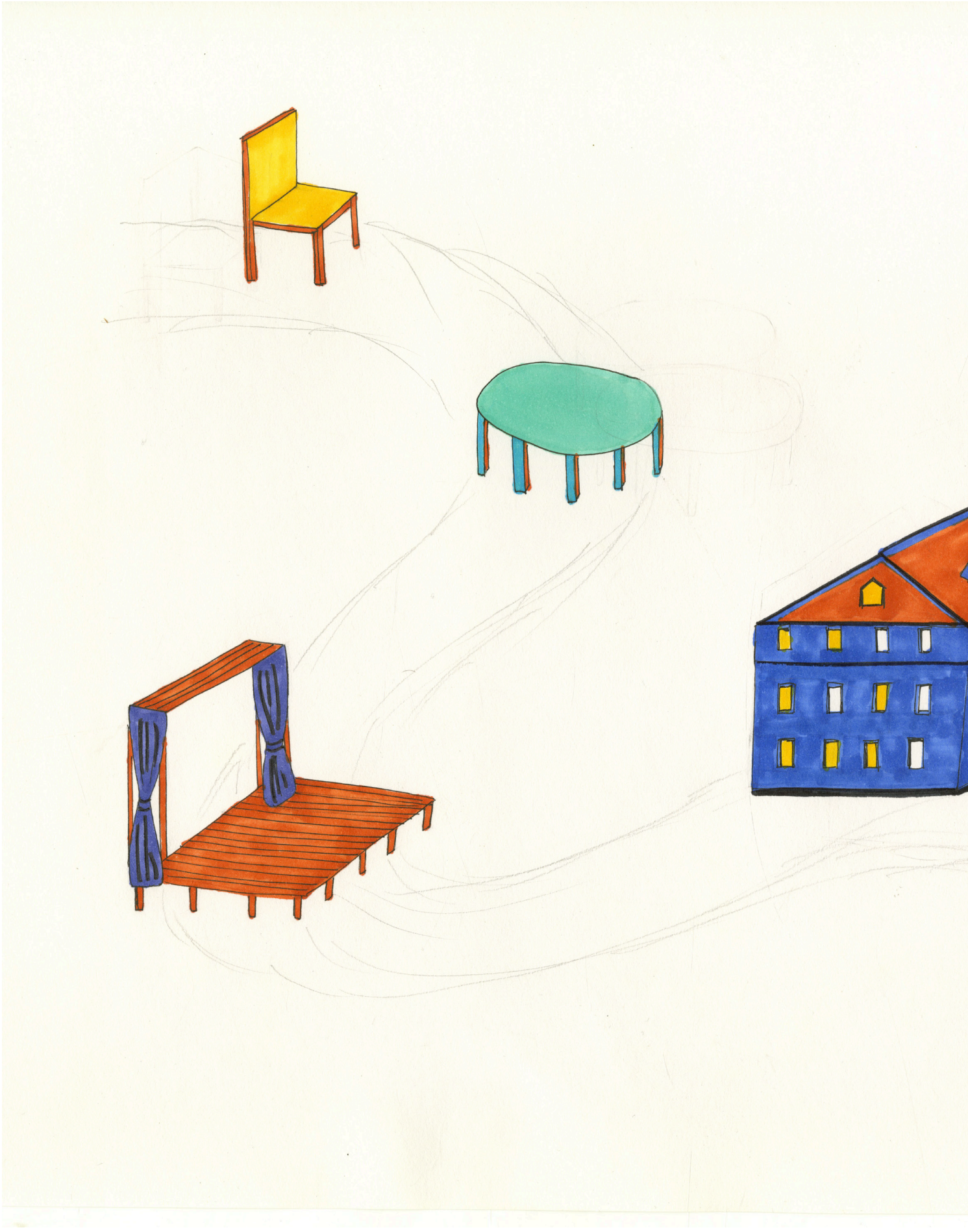


Figure 33
A poster of how to use a jigsaw, as demonstrated by the students of Sculpture School.



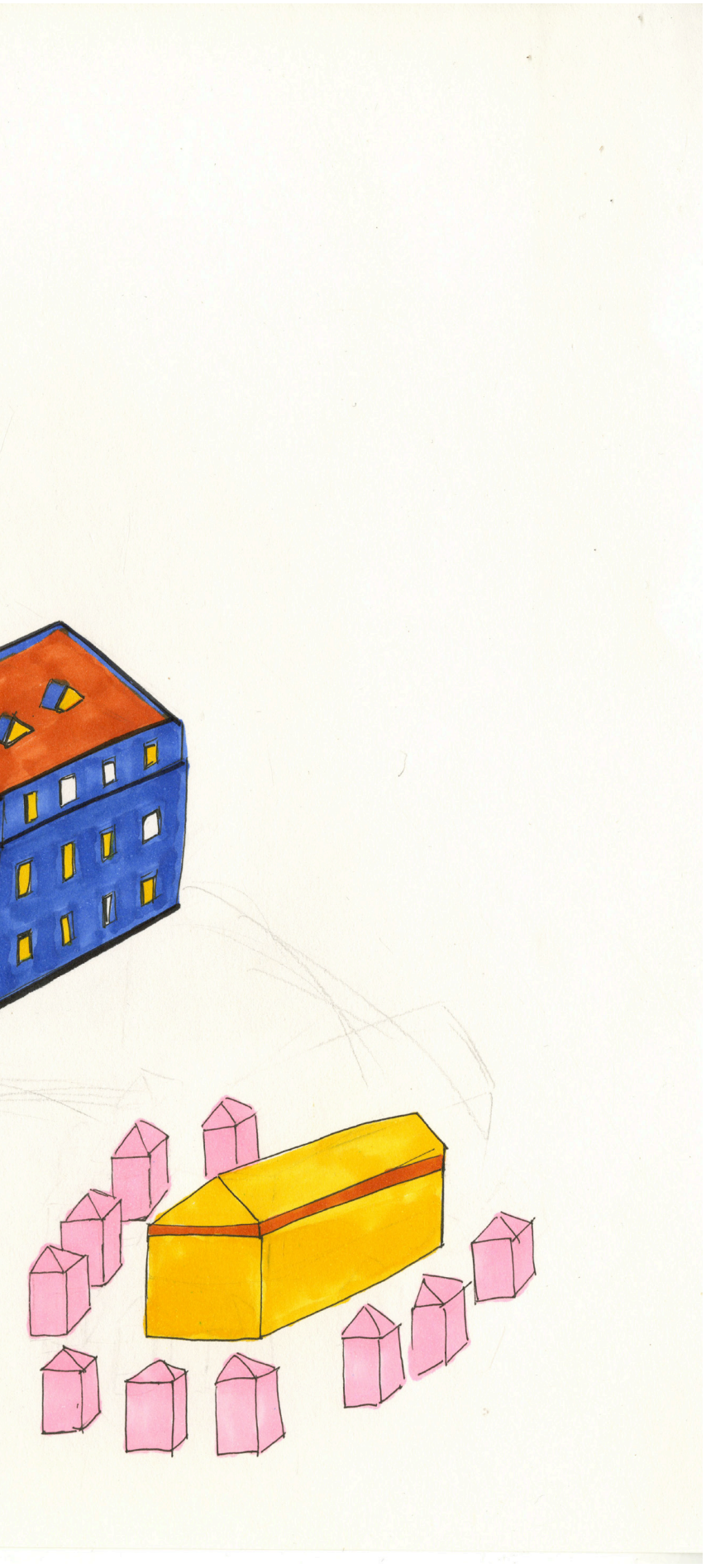


Figure 34
The progression of the impact of the pedagogy as it moves from furniture creation, to larger communal furniture, to theater and community project, to the transformation of the physical school and the wider neighborhood.

Transformed Classroom

Although a barn in rural Vermont might seem very different from an urban classroom, these learnings are both replicable and scalable. As an anchor for the students, this new program provides a home base for their making, which they can use to respond to other classwork. Things you make move with you as you grow through the program while others are passed on. Their third teacher turns from classroom to workspace. Students learn how to use basic tools. They care for their spaces; desks are fixed, doors are widened. Maintenance and caring for the space makes for a richer daily experience of school.

Figure 35 (right)
Classroom installation at Final Review as a model of the proposed pedagogy.

Figure 36 (right)
A snippet from a series of unfolded elevation and plan drawings of a transformed classroom through engaged pedagogy.

Figure 35

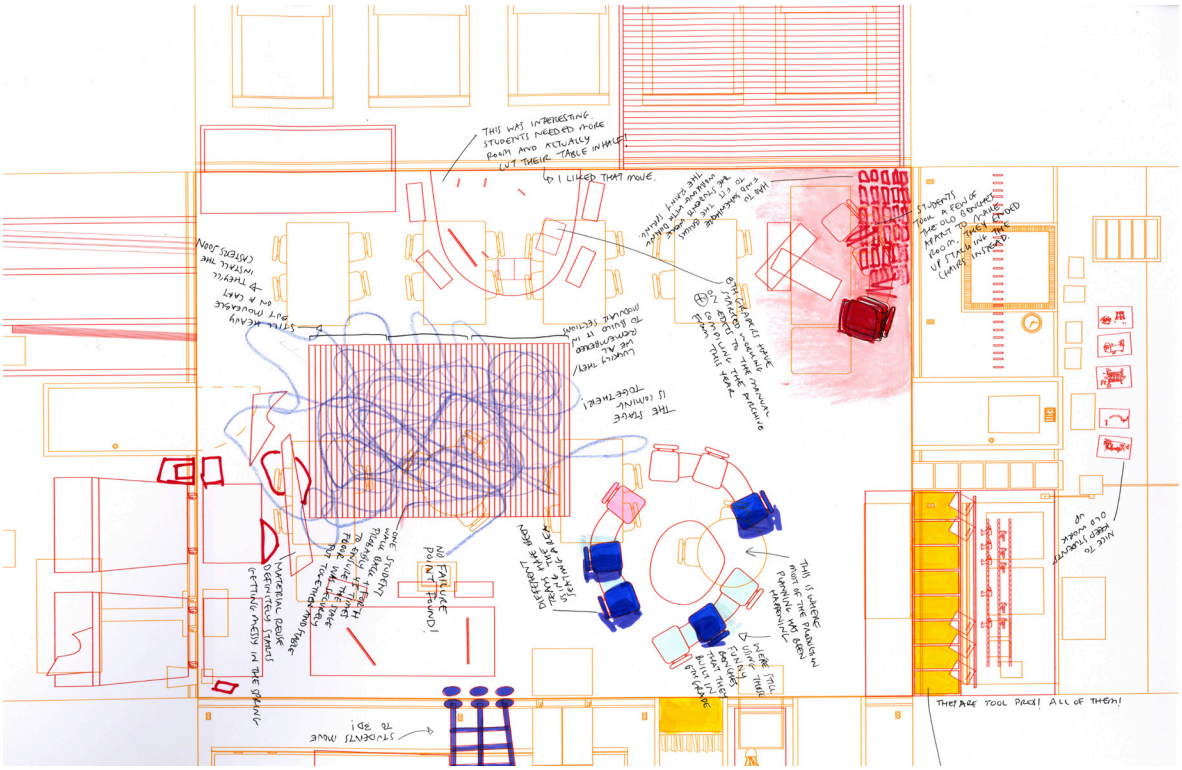


Figure 36

Curriculum Ribbons

The pedagogy builds off of the cycles of growth and transformation that happen naturally in middle school. It follows the cycles of our planet, charting along with the students their growth over the school year, while also taking advantage of the larger cycle of development between grades 6 and 8. 8th grade students mentor 6th graders and collaborate with 7th graders. At this age, students learn from their teachers but even more from their peers.

I've structured the academic year around cycles of learning.

Fall

Dedicated to foraging and disassembly, inquiry and experimentation.

Winter

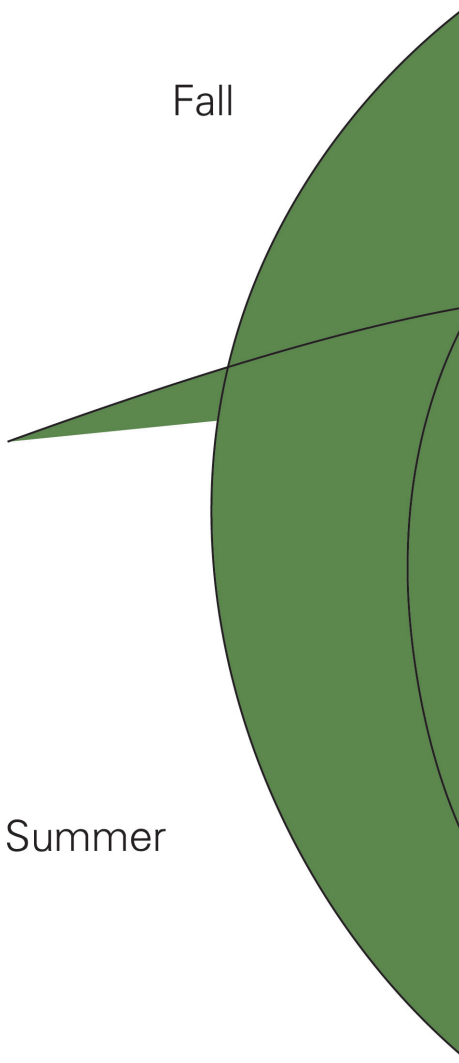
Geared toward understanding design methods, collaborative practices, forging connections to the community, and time for thoughtful planning and coordinating.

Spring

Lessons plans made for hard creative work. This is where the making picks up steam after a reflective winter.

Summer

The last month of school is a time for celebration.



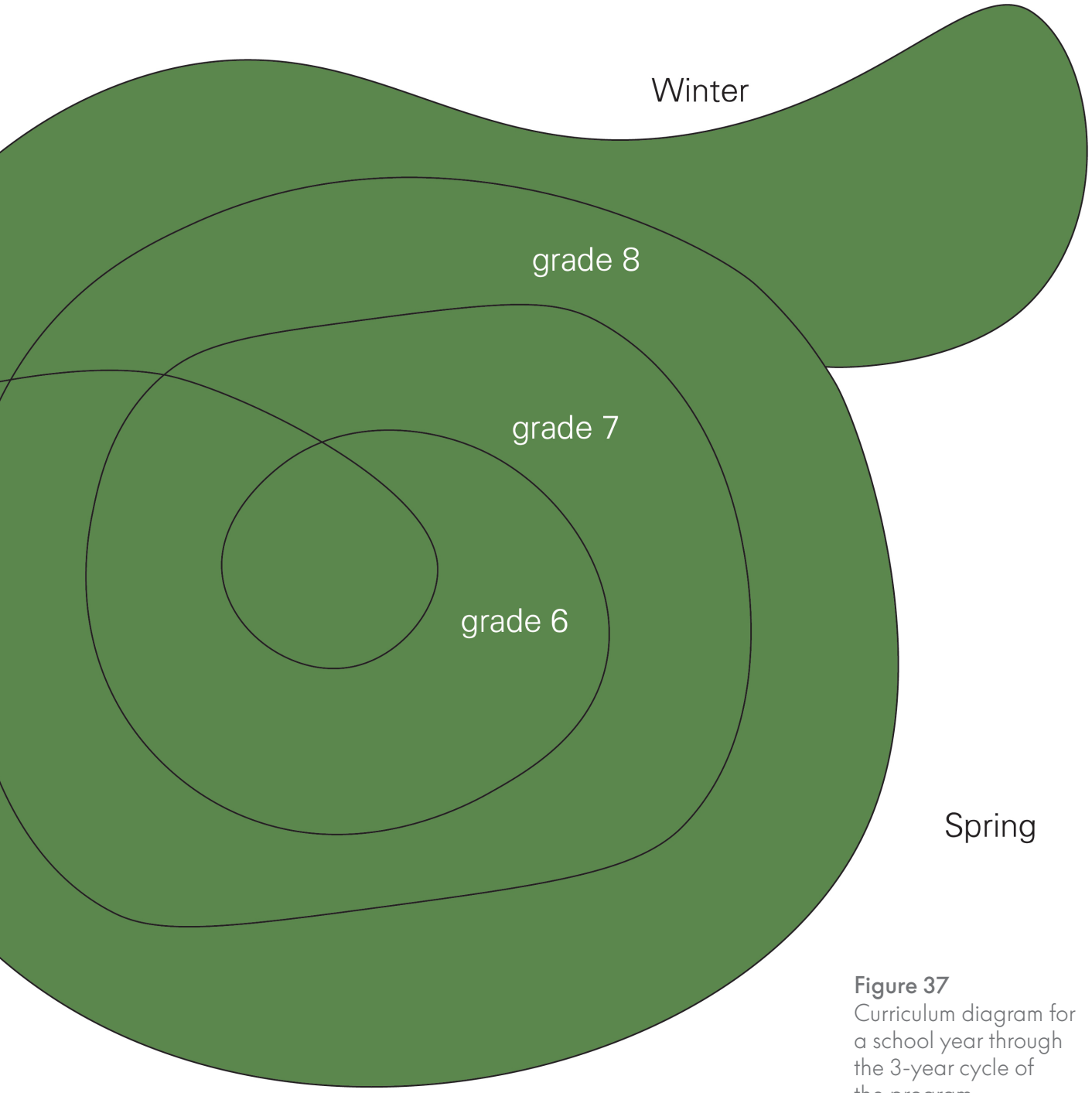
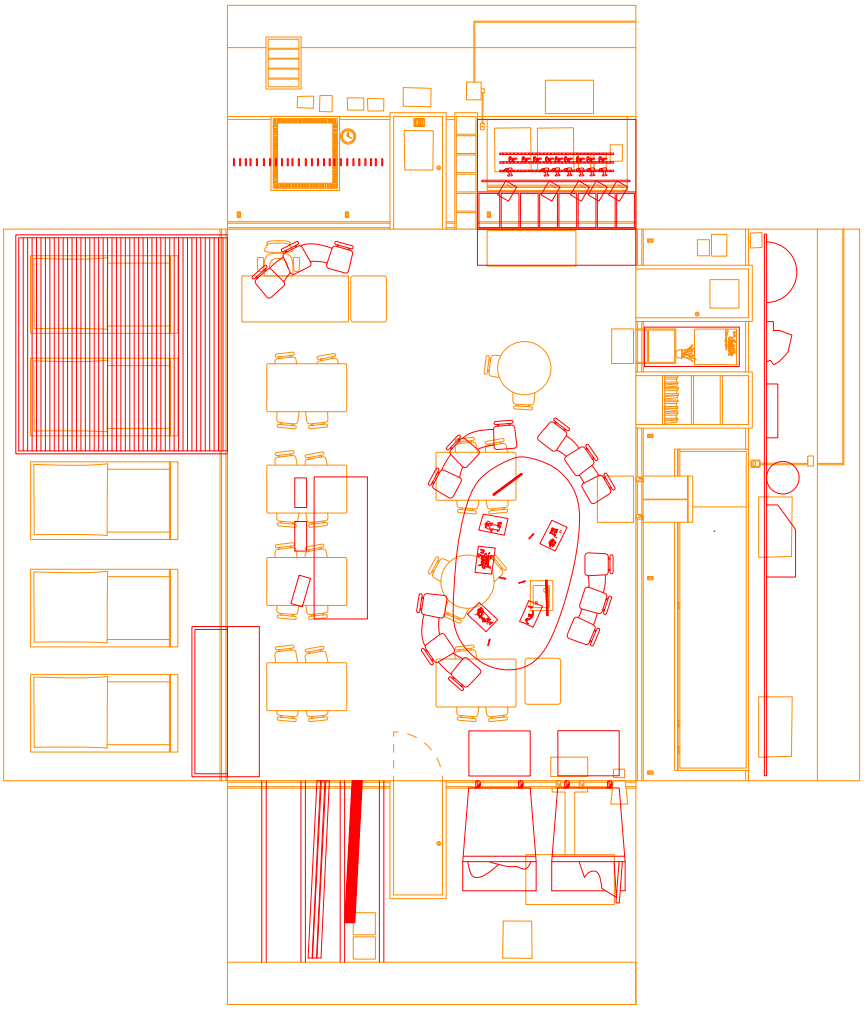


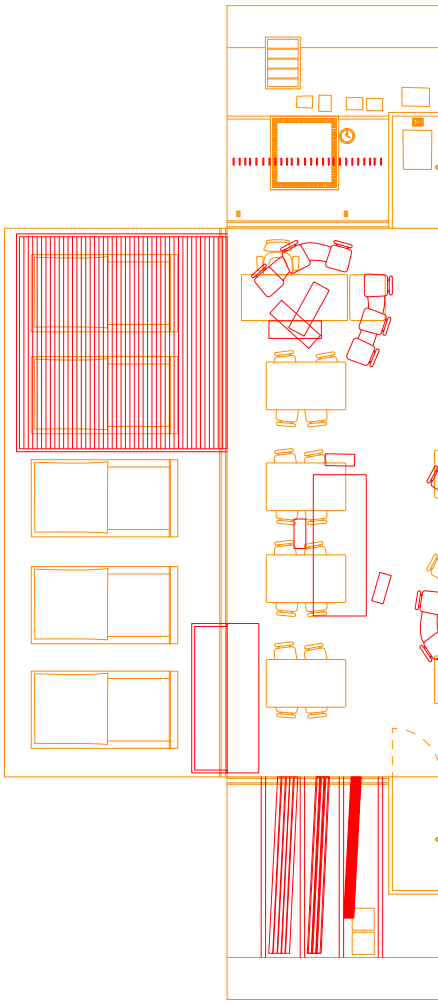
Figure 37
Curriculum diagram for a school year through the 3-year cycle of the program.

Figure 38
Drawings of a changing classroom. From original (in orange), to transformed (in red). The students, teacher, and activities shape the architecture of the space, its use, and its possibilities.

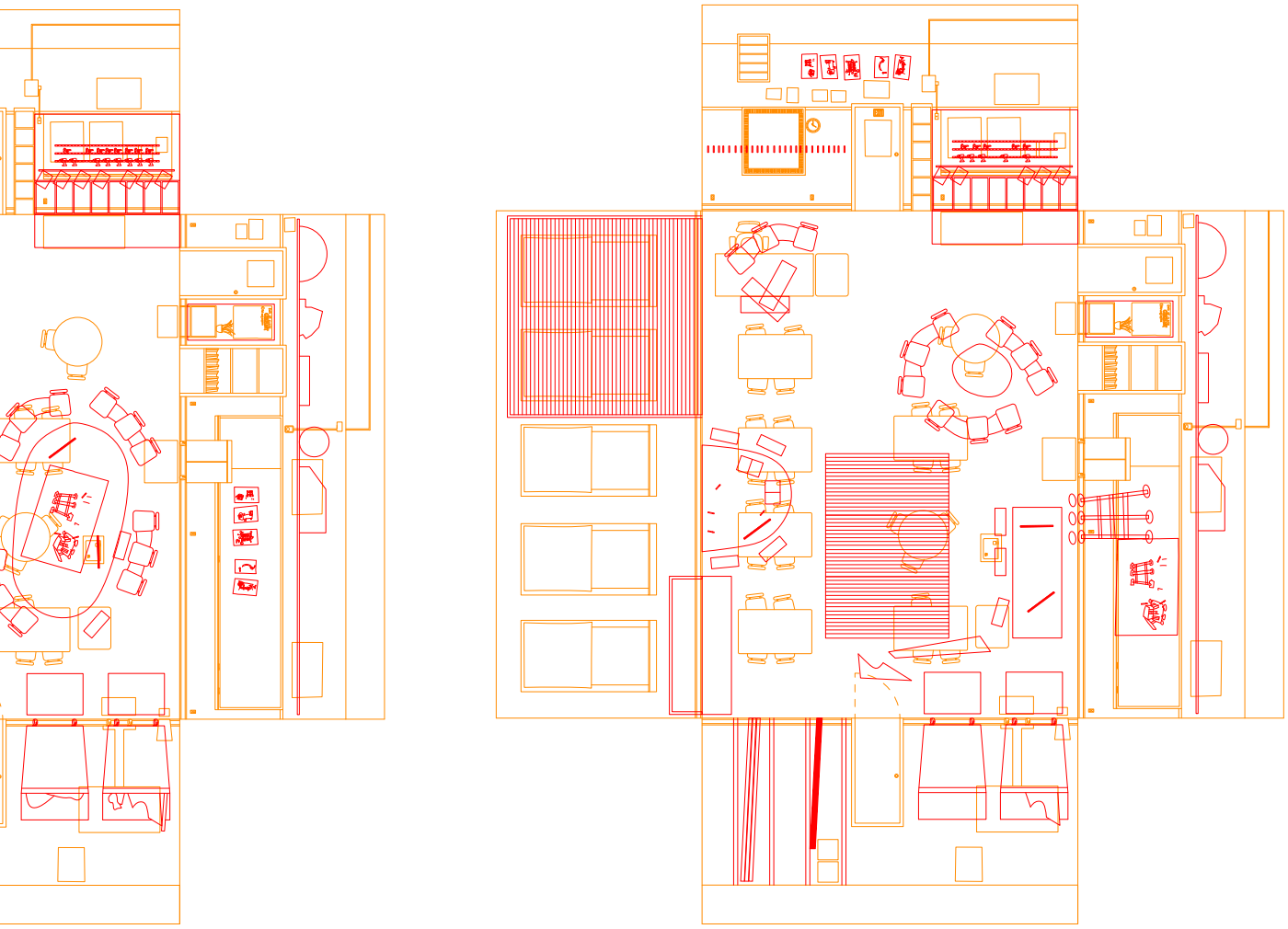
Grade 6, Fall



Grade 7, Winter



Grade 8, Spring



Key Values

School plays an important role in reinforcing value sets. The following values, which provide the backbone for this pedagogy, stem from research, experience, and studies in both education and architecture. They reflect the core values of my generation of architectural thinkers and makers, working toward a more just and resilient future.

This program teaches from the bottom up, not the top down.

It does not value the expert approach, but the individual approach.

It answers to immediate needs, what is on hand, what the community surfaces for the students.

It encourages students to follow leads and explore curiosities.

It teaches a method of material and physical inquiry.

It is collective and co-authored.

Ideas are tested, forgotten, left behind, and revisited.

Materials and ideas are shared, inherited, disagreed upon, and subsequently passed down.

Students learn directly in 1:1 making, jumping scales indiscriminately against the linear method of design.

The six values at the core of the curriculum:

Collaboration, as a means to all making

Community, as the central node

Mentorship, learning from and passing down

Interdisciplinarity, no problem sits neatly between disciplinary boundaries

Improvisation, as a tool for dealing with uncertainty

Material Opportunism, favoring salvaged parts to reuse and repurpose

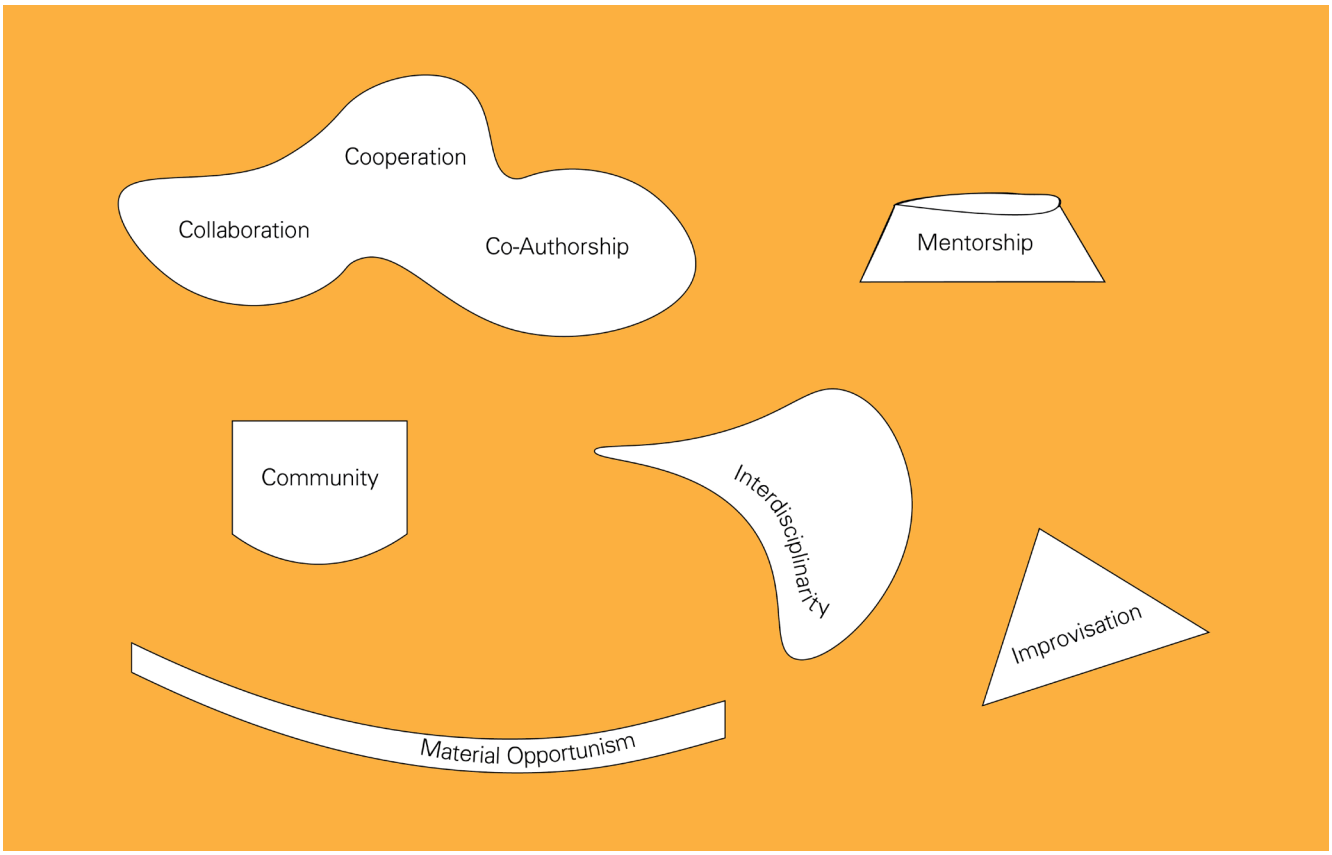


Figure 39
The pedagogy rests on six core values.

Anchor Charts

Figure 40, 42-47
Anchor charts, ie curriculum posters, for lesson plans derived from the daydreaming bench.

The coursework is versatile, it is resilient and scalable, meeting the students where they are, and following them where they'd like to be. It can be responsive to a very individual prompt or challenge, or to a broader one with flexibility. It is orchestrated by the students, but is in dialogue with both curricular and community needs. **Anything can be significant.**

The Daydreaming Bench becomes an avenue for teaching the students geometry and how to write haiku. Sit-ins and disability rights are discussed through the social sciences curriculum. The building material the students used for the project, mainly spruce 2x4s sourced locally, is considered as basis for natural sciences lessons.

Figure 41
A bench for daydreaming, featuring its creators: Sam and Harris.

How do we find the best angle for daydreaming?

Just right

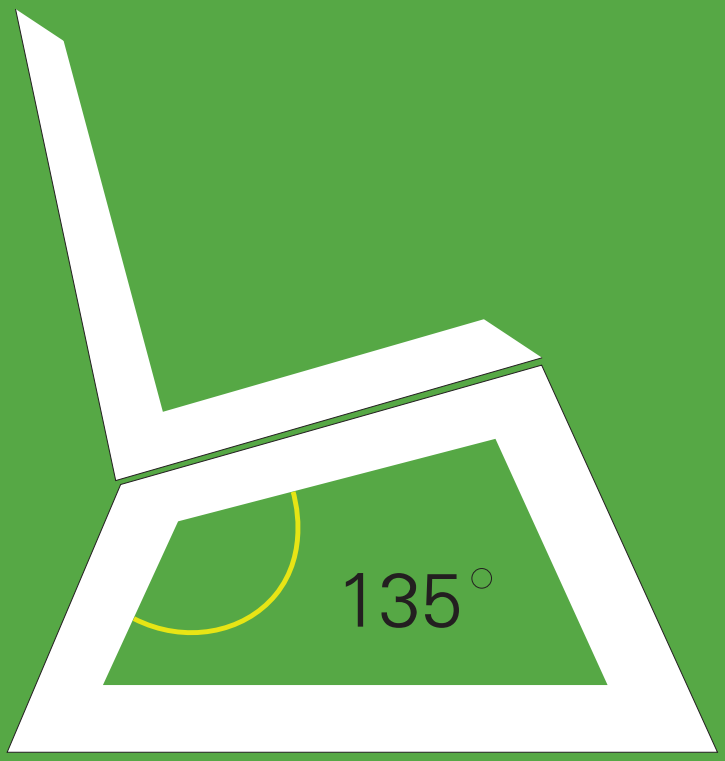


Figure 42

Mathematics Curriculum

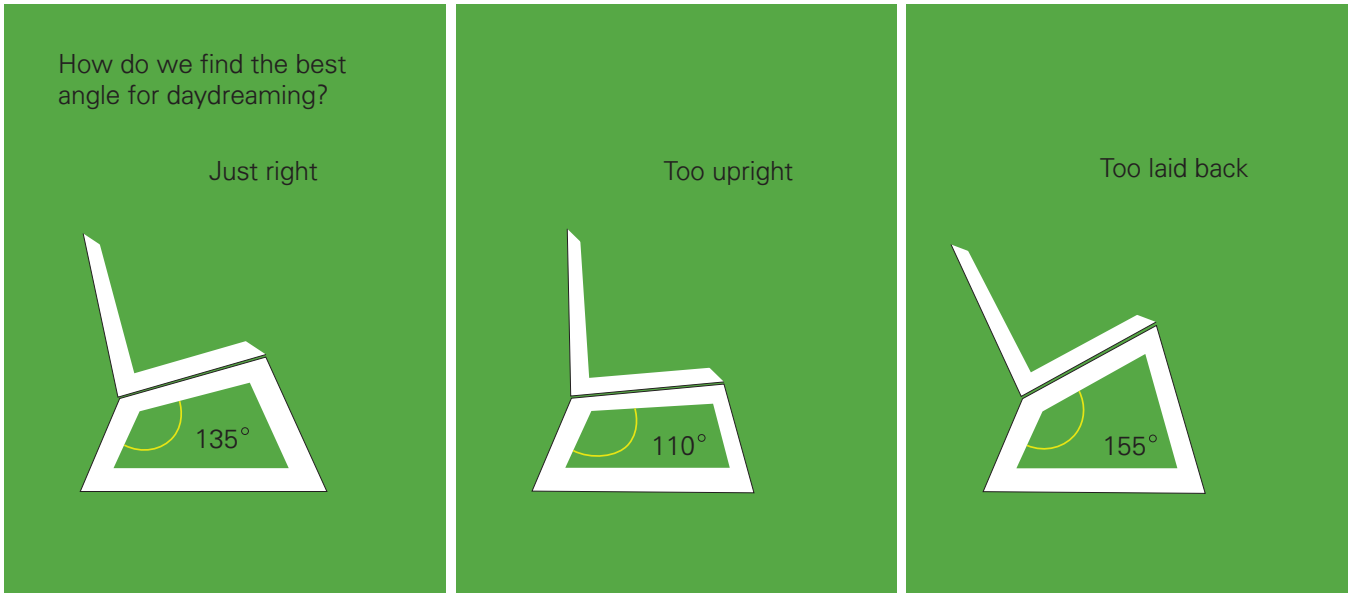


Figure 43

Natural Sciences Curriculum

Figure 44

Figure 45

A Daydreaming Haiku

Sitting here, I dream,
1 2 3 4 5

Head back, and eyes to the sky,
1 2 3 4 5 6 7

Thoughts flowing freely.
1 2 3 4 5

Literary Arts Curriculum

Haiku

Began in 13th century Japan as the opening phrase of renga, an extended oral poem

Haiku consists of 3 lines:

5 syllables
7 syllables
5 syllables

Tips for Writing Haiku

Use simple imagery.

Avoid similes, metaphors, and eloquent adjectives and adverbs.

Present an observation.

Use sight, touch, sound, smell, taste, or sensations.

A Daydreaming Haiku

Sitting here, I dream,
1 2 3 4 5
Head back, and eyes to the sky,
1 2 3 4 5 6 7
Thoughts flowing freely.
1 2 3 4 5

Figure 46

Social Sciences Curriculum

Sit-ins

Sit-ins are a form of non-violent direct action in which people occupy an area to push for change.

Sitting
to dream a
better world
into being.

to protest racial segregation
lunch counter sit-ins, 1940s–60s

to advocate for disability rights
the 504 sit-in,1977

to protest economic inequity
Occupy Wall Street, 2011

S-I-T strategy

for approaching primary or secondary sources.

turn and talk about:

one Surprising fact or idea
one Interesting fact or idea
one Troubling fact or idea

Figure 47

Community Output

This program is malleable, reactive to both its students and larger community. It changes with each cohort and based on the current needs of the wider neighborhood. Each school year is defined by an overarching project that guides lessons in all courses. It's a chance for the wider community to have a say in what is important.

Through an RFP process, community organizations, local businesses, civic spaces such as the library reading room, and individuals can apply to have the students use their request as a starting point and instigator.

An imagined example:

Mr. Gideonse, who lives a few blocks down from school, put in a request for a renovation of his deck. At first glance, the students dismissed this request as too narrow and too individual. But, Greg Gideonse's property is on the corner of the block, his backyard is accessible both from the sidewalk and from his back door. And after conversations with Gideonse, the students concluded that there was much more to be understood about this proposition than they originally assumed.

Following the logic of the prompts approach, the students set out to rethink the request to build a deck. What does a deck actually do? What behaviors does it enable or could it enable?

This is just one of many versions of this story. Any project, which may seem humble at first, can open itself up to a surprising and non-conventional line of inquiry. It can result in a host of questions, directions, and opportunities for students to engage and make a mark on the spaces they encounter.

Figure 48
The students use the neighborhood model to track the movement of both donated materials and new constructions. The white rope's tip marks a 5-min walk from the school at the center of the model. Courtesy Andy Ryan.

Figure 49
The neighborhood model stand was built from an old bed frame. It holds the prompt boxes below. Courtesy Andy Ryan.

Guiding Principles

Students of this program leave things behind and inherit from the group ahead, both ideas and materials. Guiding principles are written and rewritten, reflecting the values at the heart of this program. Each class inherits the previous year's principles, and by year's end, crafts their own, incorporating the influences of their particular group, and the lessons learned from that year's projects.

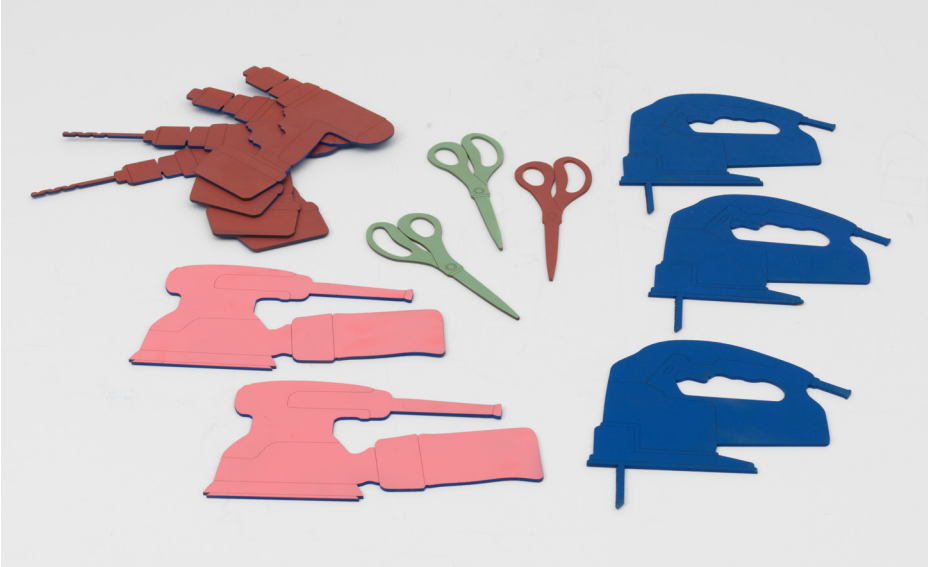


Figure 50
Examples of the tools the students of this pedagogy freely use, such as a drill and a jigsaw. Courtesy Andy Ryan.

Everything is co-authored
There's more to learn by taking the long way
Everything is borrowed, even ideas
There is no one solution
No idea is completely new
Work with what is on hand
A good question leads to even more questions
Listening is a tool in your toolbox
You can listen with more than your ears
Brainstorming is more fun together
Curiosities are worth exploring
Experimentation & analysis don't happen together
Build off of others
...

Figure 51 (right)
Photo documentation courtesy Mackinley Wang from thesis presentation featuring the guiding principles in the background.


Everything is borrowed, even ideas
Build off of others
There's more to learn by taking the long way
A good question leads to even more questions
Brainstorming is more fun together
You can listen with more than your ears

Figure 51

MATERIALS IN/OUT

RFP TRANSLATION

Figure 52
Sketches of the classroom installation for Final Review, featuring the "Materials In" blackboard and "RFP Translation" of the deck problem into prompts.

prompts

KIDS' DRAWINGS FROM WORKSHOP

MINE AND YOURS

OURS AND THEIRS

IDEAS ARE WONDERFUL

do I give it away?

MATERIALS IN

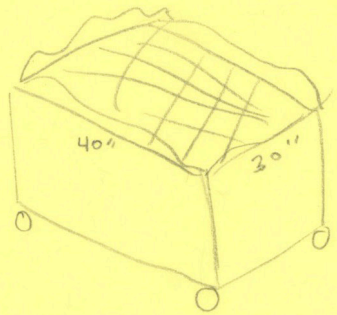
WHAT	WHO	WHEN	CONDITION

A DECK + TRELLIS?

- IT'S SOLID
- ELEVATED OFF THE GROUND
- MAY HAVE MULTIPLE LEVELS
- IT IS LEVEL FOR A TABLE
-

- FOR HIDING BELOW
- FOR STARGAZING
- FOR A BREEZE
- PRIVATE + PUBLIC
- FOR GROWING GRAPE VINES
- FOR CALM
- FOR

40"x30"?



CALL FOR

POSTER

PROPOSALS

TOOLS FOR THIS

QUESTIONS TO ASK:
- "WHAT DOES IT FEEL LIKE"
- "WHAT IS IT FOR"
- HOW DOES IT

POSTER

PROMPT BOX STORAGE

In Practice

Every Tuesday, Nora picks up her brother after school. He just started the sixth grade at the same middle school Nora graduated from a few years ago. As Nora steps off the bus, she notices fliers on the bus shelter reminding neighbors to drop used items off at school, big or small.

She thinks back to when she was in middle school herself, and how one Fall, one of her neighbors dropped off an old sink. After some brainstorming, she and her classmates were able to find a use for it in their construction. Now the program receives a lot of office chairs, blinds, ikea furniture, wood offcuts, fabric, wooden siding etc.

Neighbors hold onto their old furniture and household items and instead of throwing them in the trash, they bring them to be transformed and incorporated into the yearly project the students produce.

The students don't only use dropped off materials and foraged items from the dump, but disassemble past years' large-scale projects, like the pirate ship sitting in the school yard, and the crafted theatre on wheels from two years ago, as a way to both revisit the constructions of years passed, and to familiarize or re-familiarize themselves with tools and methods of working together after a long summer.

Students' hands and bodies, which change so much and so quickly at this age, are made visible through their impact on the classroom. They design their own furniture and fill their space with gathered materials.

They collect and categorize the materials in order to store them in the school. Fitting odd items in nooks and crannies, and building new storage racks if needed.

Every year the students take on a new project together. Through new approaches to both humble and extravagant ideas, they learn methods of working and problem-solving.

Nora wonders how her brother's going to feel today. He's only a few weeks into sixth grade. She knows he's been finding it hard to adjust to a new building, and a larger group of classmates. She's hopeful that knowing his older sister had a hand in painting the walls and building the benches that he sits on in class will help him feel more comfortable in his new school.

...

Nora and her younger brother are fictional students who attend a middle school founded on engaged pedagogy I propose. Through building, unbuilding, rebuilding, unbuilding, and building again, knowledge is passed down through the students and through the materials. Both the classroom and the built form become the third teacher, layering histories new and old, forming traditions of embodied place-making.

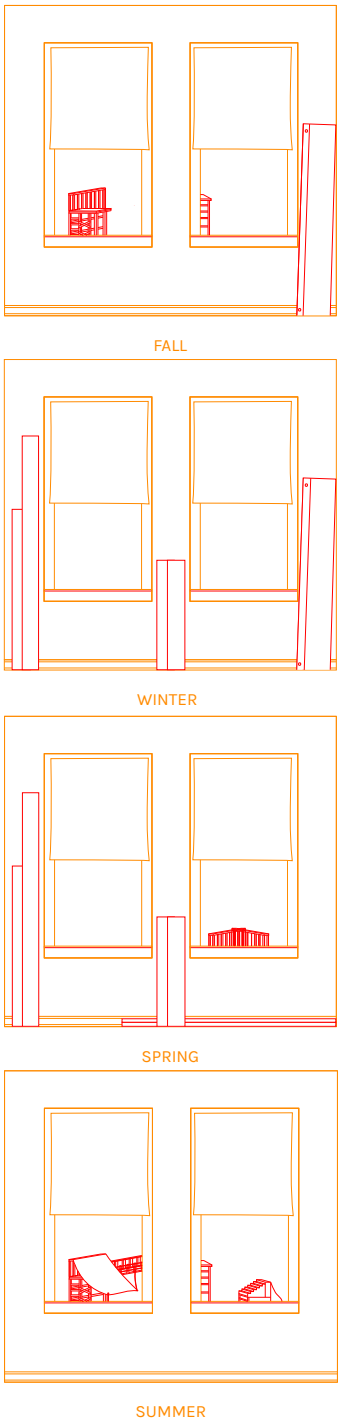


Figure 53
The evolution of the classroom and schoolyard over the school year as past constructions are disasembled for future reuse and reinvention.

Conclusion

This pedagogy takes students seriously as cultural, scientific, mathematical, linguistic, and embodied investigators. It recognizes the fact that kids can and are posing big questions of the world, and equips them with tools to forge through the unknown and play around.

The development of a value set in this age group that recognizes and makes for a more resilient, collaborative future is essential. Introducing a design-build pedagogy into the middle school curriculum becomes not only an opportunity to build a greater sense of autonomy for young learners by elevating students' existing skills embedded in play and experimentation, but a chance to disrupt the general assumptions we grow up with about our built environment. The design pedagogy I propose gives young adolescents a new set of tools to participate and take action in shaping their education, classroom, and community.

Education has community value. All pedagogy, at any age, has a role in shaping our value set and relationship to the world. It's important we recognize that how we set up our educational environments is intrinsically connected to the values they communicate.

Figure 54-55 (right)
Images of my classroom for Thesis Final Review at the Media Lab 12/21/23.

Figure 56-57 (following)
Article on the "Furniture for Learning" workshop at Sculpture School from The Valley Reporter. Volume 53, Number 32, 22 Nov. 2023, Waitsfield, VT.

Figure 54

Figure 55

Hyde Away hires new chef and manager

By Lisa Loomis

The Hyde Away Restaurant and Inn reopened its restaurant with a soft opening last weekend allowing the new manager and executive chef Jason Owens to test drive the new menu and to orient some new staff members.

Owens joined the Hyde Away earlier this fall. He's a native of Nashville, Tennessee, who spent 15 years in Boston professionally before returning to Nashville prior to the pandemic.

He has an extensive culinary background, having owned and managed restaurants and gourmet markets in the Boston area. More recently he was the director of a boutique hotel that was part of the Dream Hotel Group where he pioneered the opening of a location in Nashville.

KEEN TO RETURN

When he connected with Ana Dan, owner of the Hyde Away, he was keen to return to the Northeast and especially excited to move to Vermont where he'd spent a lot of time while living in Boston.

Owens said he's starting with a clean slate at the Fayston restaurant and inn and said his southern roots will be evident in the cuisine he and his team have created.

"We do have an entirely new team and as a result, we have our own menu that is surrounded by our passions and what we want to be cooking for supper," he said.

The new menu, he said, is not going too far away from family friendly, winter comfort food, French country food. He said the new menu features the types of offerings that cater to locals and tourists alike and said that they are sourcing more things locally, like cheeses, meats, local bread, and venison.

DO IT BETTER

"The new menu is smaller. One of our first priorities was to do less, but do it better," he said, sharing some new offerings such as pan-fried gnocchi, duck a l'orange, warm crab dip and venison meat loaf.

He also said that the menu will adapt to the seasons and promised that Taco Tuesday would return in December. Until December, the restaurant will be closed Tuesdays and Wednesdays.

Owens started cooking at 15 years old. His first restaurant job was as a dishwasher and bus boy at a steak house.

"I'd see the chefs having such a great time and thought 'man, I want to do that.' I'd get caught up on my work and go watch them to try and learn. Then someone didn't show up for a shift and I got to fill in. I moved on from there," he recalled.

"At the end of the day, it's about making a good supper," he added.

Kids rethink classroom furniture in workshop

By Tracy Brannstrom

"What is the furniture like, in the space where you learn?" Katie Rotman asked a group of seven kids in a one-day workshop she taught at Sculpture School in Fayston on Saturday, November 18.

The kids responded, "Boring desks with cold plastic chairs!"

"Yeah, pretty boring."

"Chairs that are either way too big, or way too small."

The purpose of the workshop, called Furniture for Learning, was to get kids to reconsider their daily classroom furniture and brainstorm ways of improving it for hands-on learning. As a fourth-year graduate student at the Massachusetts Institute of Technology (MIT) School of Architecture and Planning, Rotman designed and taught the class as part of her Master's thesis.

SOMETHING THAT WOBBLES

Class participants were in sixth to ninth grade. Some attended public school, others were homeschooled and a few had experienced both. After some dialogue about how they perceived the furniture in their classrooms or other learning spaces, kids had four hours to design and build an item of furniture.

But, there were constraints. Each student pulled paper cards that had specific qualities and intentions printed on them: furniture that stands on an odd number of legs, or has parts that bend. Cards prompted them to create furniture for listening, for stretching, or for looking at something closely.

Rotman brought reclaimed materials that she collected from the salvage piles of MIT building basements – rope, wooden shutters, yoga mats, bamboo blinds, old curtains, and the bottom of an office chair. Students used these materials along with recycled 2x4s from the Sculpture School woodshop.

They sketched their ideas, shared them with the larger group, got feedback and ultimately produced five pieces of furniture. One group pulled cards instructing them to build something that wobbles and is used for snacking. They made a two-person rocking chair complete with a cloth cover and beverage holders.

Another group created a bench that seats three kids engaged in a state of daydreaming. Rotman said the striking thing about their process was how they developed the piece as they went along – improvising with different materials and tweaking the structure to accommodate bodies of different sizes. "What's the perfect daydreaming angle?" she asked, "It seems like they found it."

THE THIRD TEACHER

Rotman was teaching in an afterschool program in New York City in 2018 when she got curious about how to give kids autonomy in designing and constructing the spaces they learn in. She described walking a group of kindergarteners from their school to the afterschool program, watching them comb their hands over the brick walls they passed by, or hiding in nooks along the way. "They were reacting to their built environment in a way that I really started paying attention to," she said.

Continued on Page 11

Figure 56

International Boutique benefits Amurtel teams

Amurtel teams have been stretched this year with responses including earthquake relief, an increased need for psycho-social trauma support, the increased violence in Haiti, along with programs supporting women and children suffering from increased levels of poverty around the world. Here is an overview of some of what the organizations has been doing this year.

In Turkey on February 6, 2023, a 7.8 magnitude earthquake struck Turkey and Syria, leaving over 53,000 people dead, and more than 100,000 injured. Amurtel teams began working with local groups to distribute food, tents and household goods. Amurtel stocked and restocked five local clinics treating the injured. Teams set up Child Friendly Spaces, offering a safe place for children to come and be with staff trained in working through trauma. The group offered psycho-social emergency first aid to hundreds, as well as training local professionals in these tools.

"Over the past six years, Amurtel has been developing an effective approach to psychological trauma resulting from manmade and natural disasters. There is a growing body of evidence suggesting if these emotional traumas are addressed early on, there is less likelihood of PTSD developing. Our teams work directly with victims, and provide training to social workers and psychologists who can continue working with those affected," explained boutique founder and Amurtel president Joni Zweig, Warren.

In Morocco, on September 8, a 6.8 magnitude earthquake struck, effecting rural villages in the Atlas Mountain range. Thousands were killed by collapsing buildings, with many more left without shelter in the harsh weather. Amurtel teams found heartbreaking tableaus of entire areas buried under rubble, with local villagers using their bare hands to dig out family members. Amurtel provided hot meals, built tent shelters, and provided emergency psycho-social relief. Teams offered group sessions to the doctors and nurses working around the clock to save those who had been badly injured. Many shared how they themselves had lost family members, their homes, etc. and had been working without rest to save friends and neighbors.

"They asked if we could continue to work with them as it was like a candle in the darkness," Zweig said.

War continues to ravage Ukraine, with people retreating to bomb shelters when the sirens go off. Amurtel

Continued on Page 17

Classroom furniture

Photo: Eddie Merma.

A student creation of a classroom table and stools.

Continued from Page 11

Elements of a built environment, she added, have far-reaching social implications. "In education, we talk about the classroom as the 'third teacher.' It means, you won't feel empowered to pick up a drill unless there's a whole wall of drills in front of you, and you see how they can be used, and what's been made with them before. The space around you essentially has a huge impact on what you think you can do, and what's possible."

In addition to her Master's work, Rotman is a teaching fellow at the Harvard Graduate School of Education. She is deeply interested in the practice of teaching – drawn to learning as a process, rather than any final product that comes out of it.

She first came to Sculpture School in summer 2023 to co-teach a weeklong program alongside director Eddie Merma, where kids built large-scale boats using recycled plastic water bottles to make them float. "I was struck by how these 12-year-olds knew how to move from a sketched idea to a built form very quickly, in a way that architects don't know how to do. I was also struck by how Eddie was teaching kids to pretty much work through play – by seamlessly jumping scales, and adjusting on the go rather than planning anything fully out."

Merma founded Sculpture School almost a decade ago and began hosting other artists and educators to teach their own classes a few years ago. "One of my goals is to make room for teachers to experiment – to use the woodshop here as a lab for workshopping ideas around experiential education, or in finding intersections across disciplines" he said.

BOTTOM-UP EDUCATION

While Rotman got to experiment with her pedagogy at Sculpture School, she said that one of the goals of her graduate work was to better understand some of the limitations around facilitating kids to design and build their educational spaces. School districts might need to drastically alter their curriculum for it to happen, she said. "I've been talking to middle school teachers in Boston who desperately want to do project-based learning in their classrooms, but their school boards don't have ways to assess student's learning."

Liability is a huge issue, she added. "I think it scares people to see kids using power tools, but middle schoolers understand the risks and how to do things safely. They're invested in what they're making, so they're paying attention."

Rotman brought the furniture pieces from Saturday's workshop back to MIT. She will build a makeshift classroom to display them in for her thesis exhibition at the school's Media Lab in late December.

Going forward, Rotman said she hopes to see a shift in schooling, toward more hands-on learning in workshop spaces – like shop classes of the past. "Although," she added, "that was very top-down, where kids were taught how to make certain things in the 'right' way." She's more interested in "teaching from the bottom up" – where kids have agency in deciding what to make without the pressure to do it 'properly.'

"A lot of the kids, as they were making their furniture, were saying 'oh, this would be crazy if I had this in my school!' Rotman said. "I was glad they quickly grasped how asking that question – what kind of furniture would you build for learning? – can open up a whole world of rethinking what's possible in the classroom."

Figure 57

References

Abtahi, Yasmine. "Pupils, tools and the Zone of Proximal Development." *Research in Mathematics Education*, vol. 20, no. 1, 2018, pp. 1-13, DOI: 101 0.1080/14794802.2017.1390691

Arnold, John. "A Curriculum to Empower Young Adolescents." *Annual Meeting of the National Middle School Assocation*, 5-8 Nov. 1992, www.eric.ed.gov/?id=ED361913.

Barry, Lynda. *Syllabus*. First paperback edition., Drawn & Quarterly, 2014.

Brimberg, Stan. "The Fall and Rise of the 8th Grade School." *Bank Street School for Children*, www.school.bankstreet.edu/about/our-approach/progressive-education-rooted-in-tradition/the-fall-and-rise-of-the-8th-grade-school/.

Bunch, Clarence and John Lidstone. *Working Big: A Teachers' Guide to Environmental Sculpture*. Litton Educational Publishing, 1975.

Burkhalter, Gabriela. The Playground Project. JRP/Ringier, 2016.

Cohen, Janie (ed.). *Architectural Improvisation: A History of Vermont's Design/Build Movement 1964-1977*. University of Vermont Press and Robert Hull Fleming Museum, 2008.

Colomina, Beatriz, et al., editors. *Radical Pedagogies*. The MIT Press, 2022.

Day, Christopher, and Anita. Midbjer. *Environment and Children: Passive Lessons from the Everyday Environment*. 1st ed., Architectural, 2007.

de Vet, Annelys (ed.), et al. *Design Dedication: Adaptive mentalities in Design Education*. Valiz, 2020.

Fagell, Phyllis L. *Middle School Matters: The 10 Key Skills Kids Need to Thrive in Middle School and Beyond–and How Parents Can Help.* Da Capo Lifelong Books, 2019.

Field, Kelly. "What Science Tells Us about Improving Middle School." *PBS News Hour*, 6 Aug. 2011, www.pbs.org/newshour/education/what-science-tells-us-about-improving-middle-school.

Hailey, Charlie. *Design/Build with Jersey Devil: A Handbook for Education and Practice*. First edition., Princeton Architectural Press, 2016.

Hennessey, James., and Victor J. Papanek. *Nomadic Furniture: How to Build and Where to Buy Lightweight Furniture That Folds, Collapses, Stacks, Knocks-down, Inflates or Can Be Thrown Away and Re-Cycled. Being Both a Book of Instruction and a Catalog of Access for Easy Moving*. [1st ed.], Pantheon Books, 1973.

hooks, bell. *Teaching to Transgress: Education as the Practice of Freedom*. Routledge, 1994.

Jehlen, Alain. "BuildBPS 10-year plan: Close all middle schools." *Boston Parents Schoolyard News*, 29 Oct. 2018, www.schoolyardnews.com/buildbps-10-year-plan-close-all-middle-schools-ecd4eb5da484.

Kurt, Serhat. "Vygotsky's Zone of Proximal Development and Scaffolding." *Educational Technology*, 11 July 2020, www.educationaltechnology.net/vygotskys-zone-of-proximal-development-and-scaffolding/.

Lange, Alexandra. *The Design of Childhood: How the Material World Shapes Independent Kids*. Bloomsbury Publishing, 2018.

Lange, Alexandra. "Teen Girls Need Better Public Spaces to Hang Out." *Bloomberg*, 28 May 2021, www.bloomberg.com/news/features/2021-05-28/we-need-more-public-space-for-teen-girls.

Lange, Alexandra. "What It Means to Design a Space for 'Care'." *Bloomberg*, 4 Nov. 2021, www.bloomberg.com/news/features/2021-11-04/what-care-means-in-design-planning-and-architecture.

Postman, Neil., and Charles. Weingartner. *Teaching as a Subversive Activity*. Delacorte Press, 1969.

O'Donnell Wicklund Pigozzi and Peterson, and Bruce Mau Design. *The Third Teacher: 79 Ways You Can Use Design to Transform Teaching & Learning*. Abrams, 2010.

Rzeczkowska-Moren, Izabela Anna. *Where We Learn : Reimagining Educational Spaces*. Edited by François-Luc Giraldeau, Frame Publishers, 2022.

Schaefer, Mary Beth, Kathleen F. Malu & Bogum Yoon. "An Historical Overview of the Middle School Movement, 1963-2015." *RMLE Online*, 13 Apr. 2016, 39:5, DOI:10.1080/19404476.2016.1165036.

Sennett, Richard. "The Architecture of Cooperation." *Harvard Graduate School of Design*, Feb. 2012, www.youtube.com/watch?v=tcXE4NEgLn8.

Sullivan, Emily Tate. "Is Assessment Ready to Move Beyond Standardized Tests? These MIT Researchers Think So." *EdSurge*, 10 Dec. 2018, www.edsurge.com/news/2018-12-10-is-assessment-ready-to-move-beyond-standardized-tests-these-mit-researchers-think-so

Tamer, Mary. "Do Middle Schools Make Sense?" *Harvard Graduate School of Education Ed. Magazine*, 5 Sept. 2012, www.gse.harvard.edu/ideas/ed-magazine/12/09/do-middle-schools-make-sense.

Wong, Alia. "Why Is Middle School So Hard for So Many People?" *The Atlantic,* 7 Oct. 2019, www.theatlantic.com/education/archive/2019/10/why-middle-school-and-preteens-are-so-challenging/599542/.

Figures