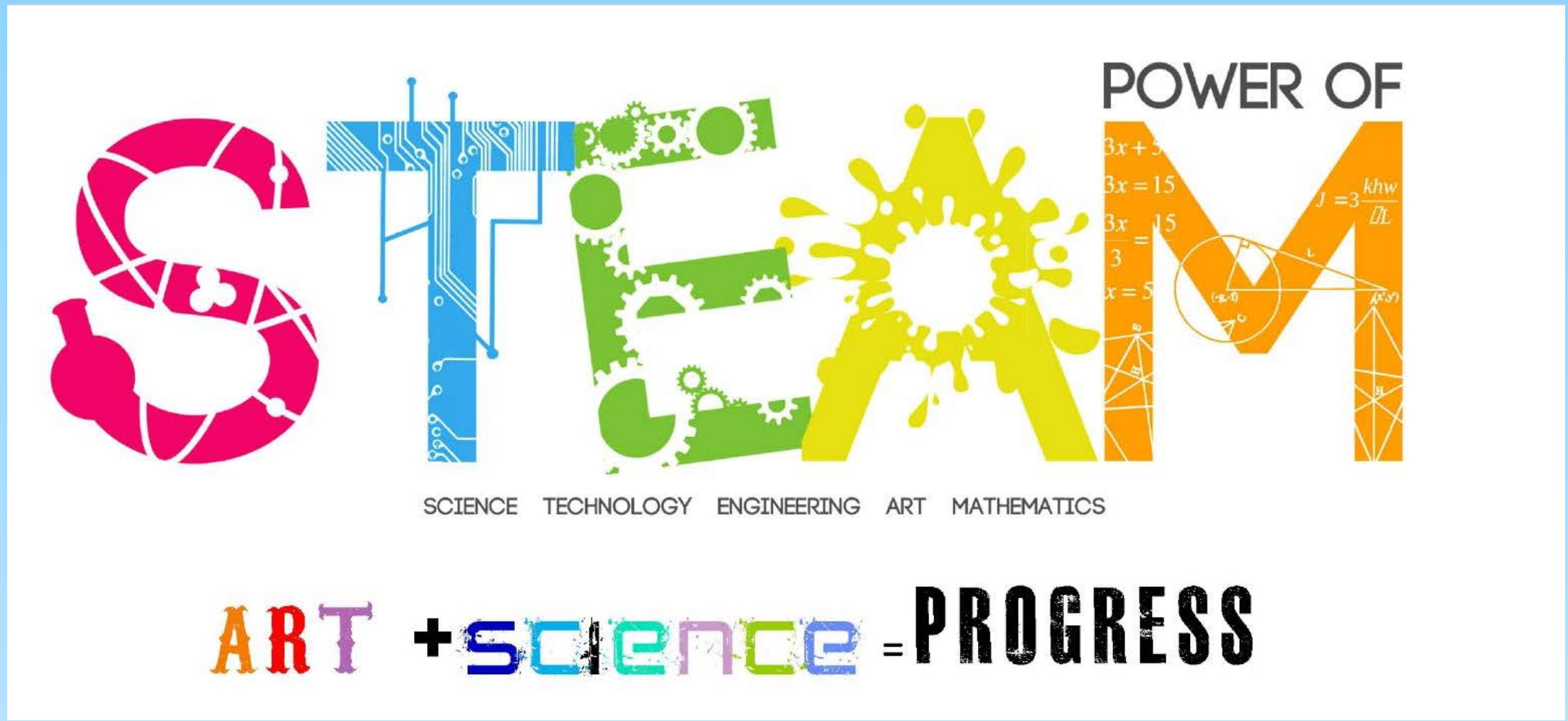


Presentation to the Mahwah Board of Education– June 14, 2017

***STEM* OR *STEAM*: *WHAT'S THE DIFFERENCE*?**

STEM education integrates concepts that are usually taught as separate subjects in different classes and emphasizes the application of knowledge to real life situations.

A variation of STEM is STEAM, which includes the "A" for art and design. Artistic design is becoming an important part of STEM education since creativity is an essential part of innovation.

STEAM INSTRUCTIONAL GOALS

The end result of a STEAM educational approach are students who take thoughtful risks, engage in experiential learning, persist in problem-solving, embrace collaboration, and work through the creative process.

Our goal is to develop students who will be the innovators, educators, leaders, and learners of the 21st century!

TO FULLY REALIZE THESE GOALS, STUDENTS NEED…

Integrated technology throughout learning spaces

Interdisciplinary experiences that allow for blended learning and problem/project-based learning

Opportunities to work in small groups so they can learn from and collaborate with each other

2016-2017 HIGH SCHOOL STEAM COURSES

Mobile App Design	STEM – Design and Process
STEM – Research	Engineering Design
STEM Capstone– Internship	Interior and Structural Design
Engineering Mechanics	Animation
Advanced Interior and Structural Design	Robotics, Advanced Robotics
Computer Modeling	Java, Advanced Java
AP Computer Science A	Drafting
Data Structures	Woodworking, all levels
Graphic Design	

2017-2018 HIGH SCHOOL STEAM COURSES

Mobile App Design	STEAM – Design and Process
STEAM – Research	~~Engineering Design~~
Honors STEAM Capstone– Internship/Research	Interior and Structural Design
~~Engineering Mechanics~~	Animation
Advanced Interior and Structural Design	~~Robotics, Advanced Robotics~~ HUMANOID ROBOTICS
Computer Modeling	~~Java, Advanced Java~~ COMPUTER PROGRAMMING AND DESIGN
AP Computer Science A	~~Drafting~~
Data Structures	Woodworking, all levels
Graphic Design	TECHNOLOGY AND ENGINEERING PRINCIPLES

WHAT WE QUICKLY REALIZED…

Although our curriculum at the high school includes innovative STEAM courses, we often must retrofit what we do into spaces designed for a compartmentalized, factory model of education.

Let's show you what we're talking about…

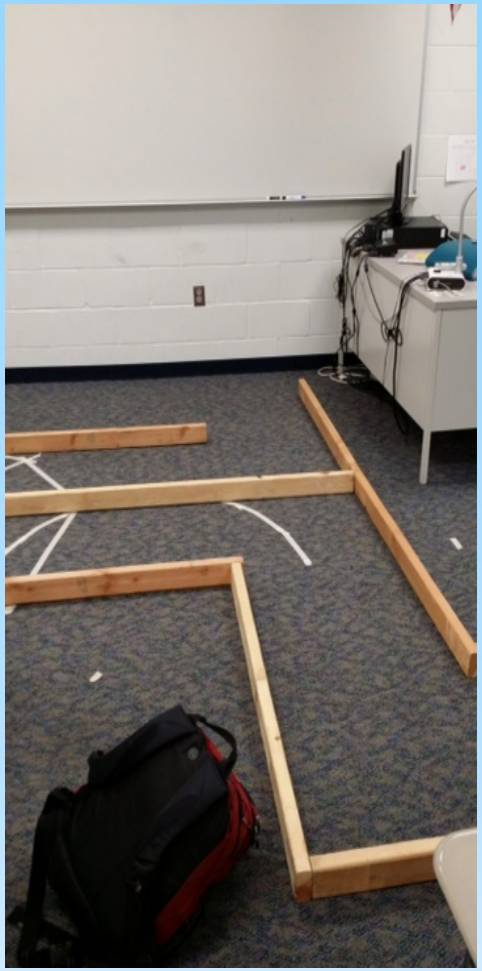
CURRENT EDUCATIONAL SPACE….

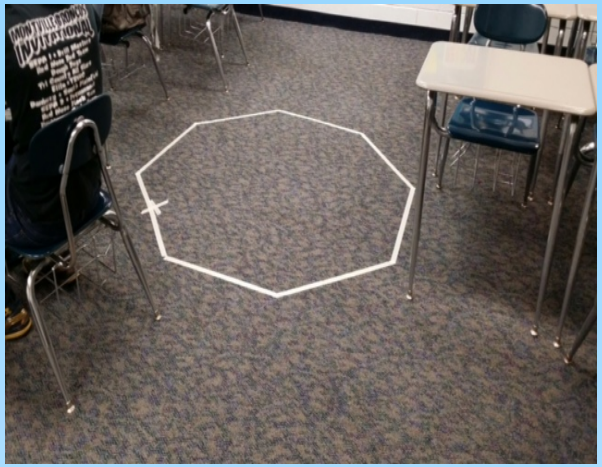
Robotics Courses

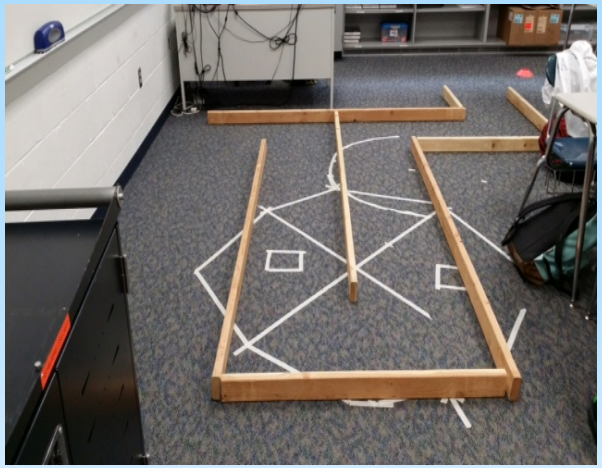
FIRST Robotics Club

ROBOTICS CLOSET

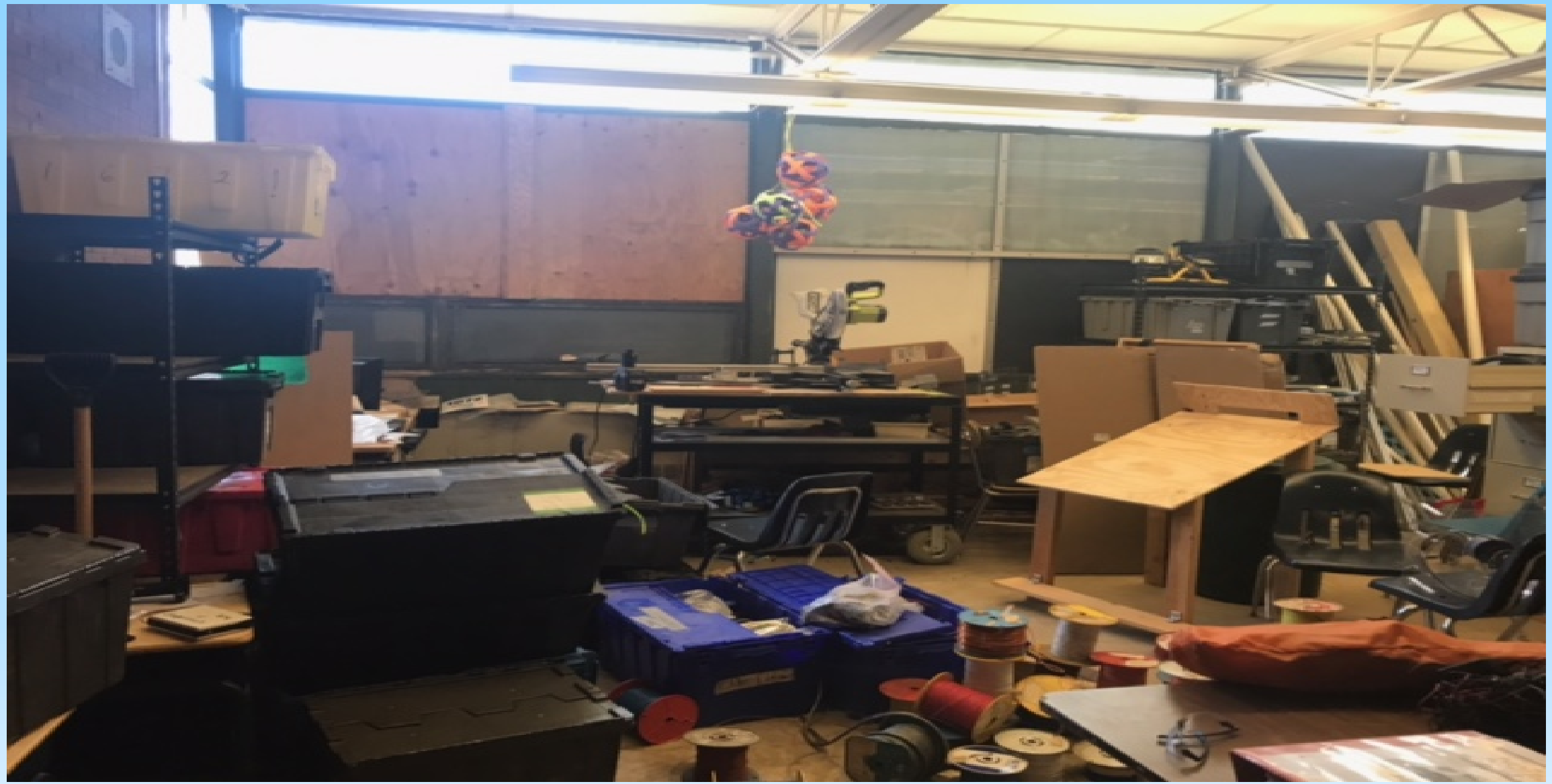
ROBOTICS ROOM







FIRST ROBOTICS CLUB



FIRST ROBOTICS CLUB

CURRENT EDUCATIONAL SPACE…

Drafting and Graphic Design

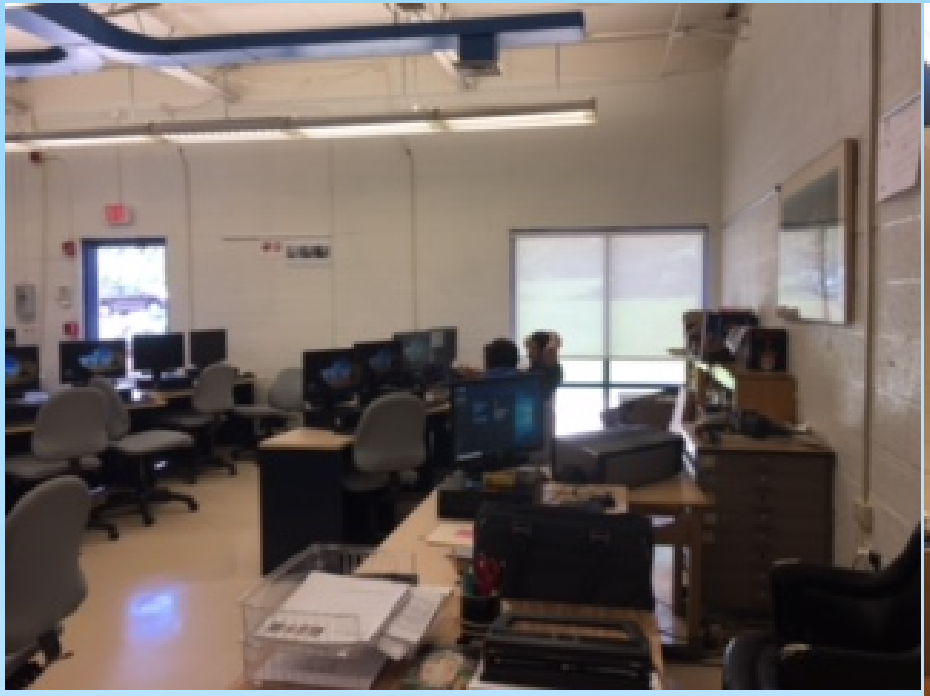
Interior Structural Design

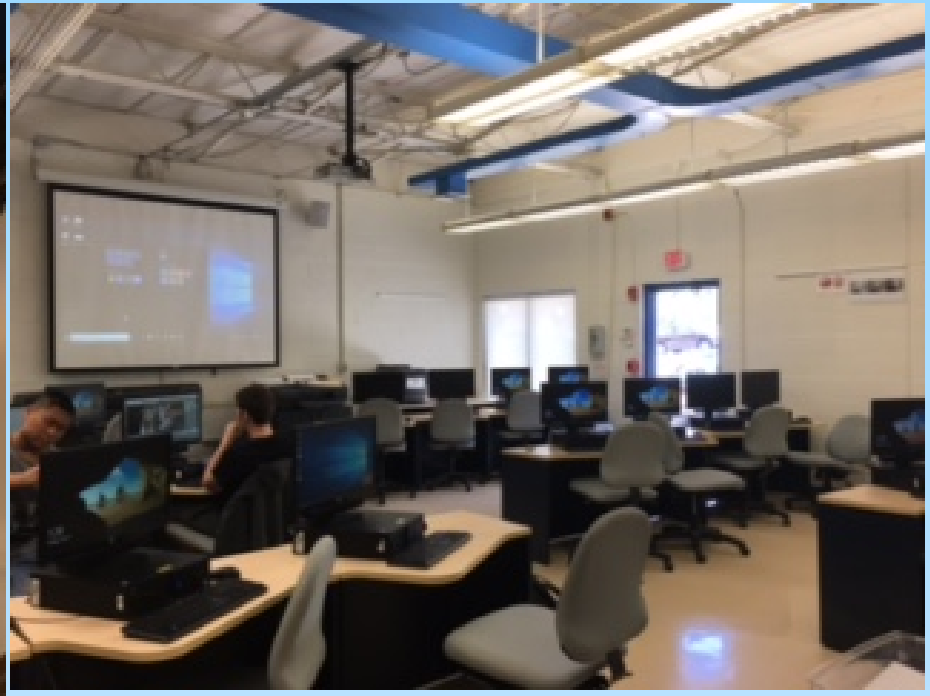
Computer Modeling

Animation

STORAGE FOR SUPPLIES AND STUDENT PROJECTS

BUILDING 7 – COMPUTER LAB





BUILDING 7

BUILDING 7

BUILDING 7

CURRENT EDUCATIONAL SPACE…

STEM –

Design and Process

CURRENT EDUCATIONAL SPACE…

CURRENT EDUCATIONAL SPACE…

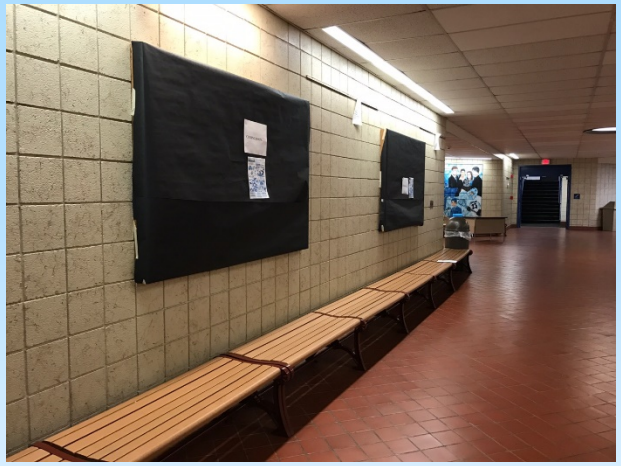
CURRENT EDUCATIONAL SPACE…

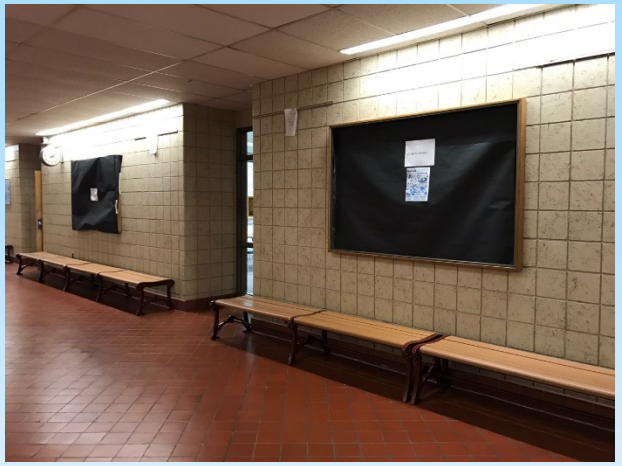
CURRENT EDUCATIONAL SPACE…

CURRENT EDUCATIONAL SPACE…

Student Art

DISPLAY OF STUDENT ART



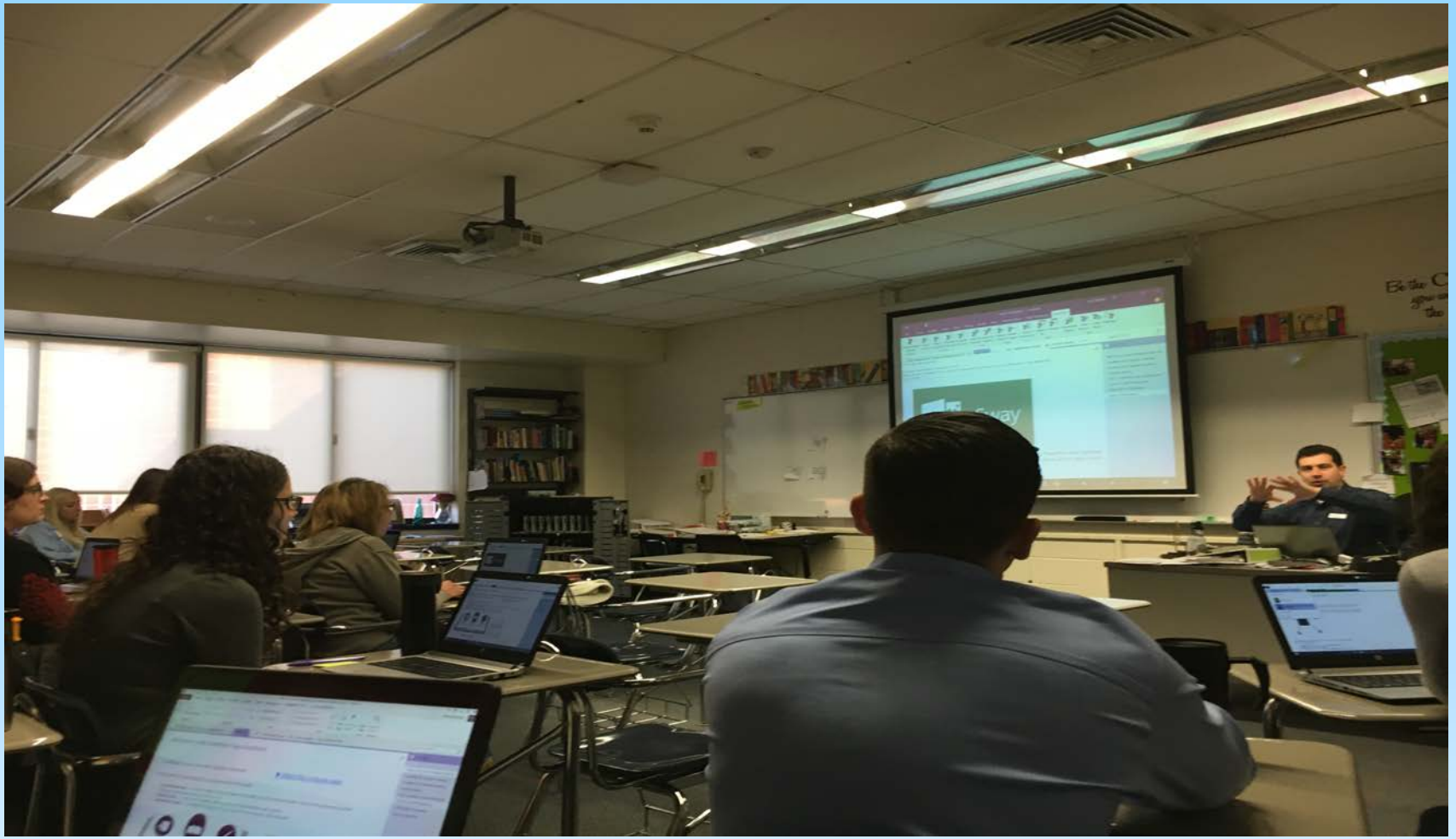


CURRENT EDUCATIONAL SPACE…

Staff

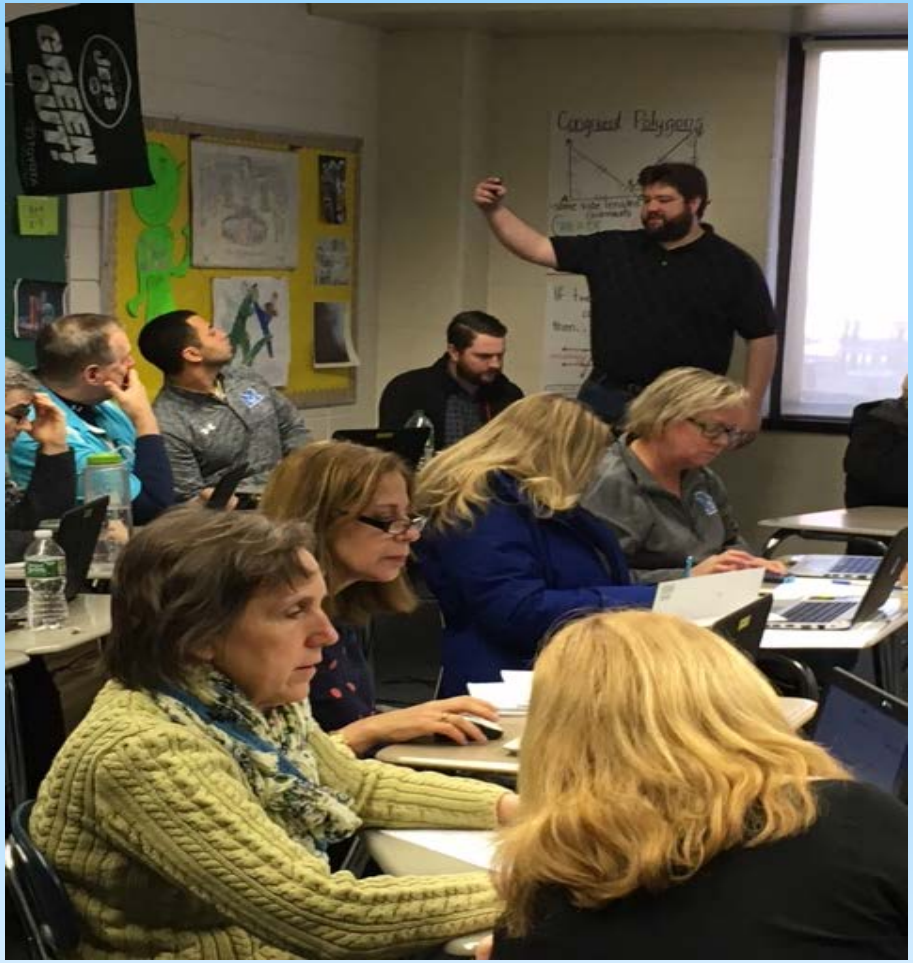
Professional Development

2016-2017
PROFESSIONAL DEVELOPMENT



2016-2017
PROFESSIONAL DEVELOPMENT

2016-2017
PROFESSIONAL DEVELOPMENT



AS YOU JUST SAW…

Although our curriculum at the high school includes innovative STEAM courses, we often must retrofit what we do into spaces designed for a compartmentalized, factory model of education.

DISTRICT STEAM COMMITTEE

John Pascale	Dennis Fare	Lauren Schoen
Rich Heissler	Taryn Pizza	Kim Loesche
Danielle Poleway	Joshua Koen (NJDOE)	Gwen Calvez
Mimi Lezanski	Carlos Rosa	Michael Galow (BOE)
Rick DeSilva (BOE)	John Dinice (BOE)	Christine Zimmermann
Kyle Bleeker	Mike Millemann (Architect)	Dennis Jarvis
Benjamin Kezmarsky (BOE)	Rick Tokarski (Architect)	Susan DeVito

DEVELOPMENT OF SUB-COMMITTEES

Courses Committee

Review current courses and discussion of potential new courses

Equipment Committee

Review technology, desks, storage, built-in outlets, shape of tables, dimmable lighting, seating

Facilities Committee

Review current instructional spaces

STEAM COMMITTEE MEETINGS

October 19, 2016

Initial discussion and review of current STEAM courses, qualities of STEAM classrooms

November 3, 2016

Invited Mr. Joshua Koen, NJDOE Chief Innovation Officer, to continue our discussion

November 14, 2016

STEAM building site visitations

STEAM COMMITTEE MEETINGS

November 17, 2016

Discussion about our site visitations (Pros and Cons)

December 7, 2016

Reviewed mission statement ideas and developed subcommittees for our December 20, 2017 meeting

December 20, 2016

Meeting with full STEAM Committee including Board members from our Facilities Committee

STEAM COMMITTEE MEETINGS

May 10, 2017

Meeting with our Board Facilities Committee

May 14, 2017

Meeting with architect to discuss preliminary ideas regarding STEAM building and conceptual drawings

June 7, 2017

Meeting with STEAM committee to discuss presentation to full Board on June 14

SITE VISITATIONS

On November 14th, our STEAM committee visited three different school districts that currently house a STEAM facility as part of one of their schools or in a separate building.

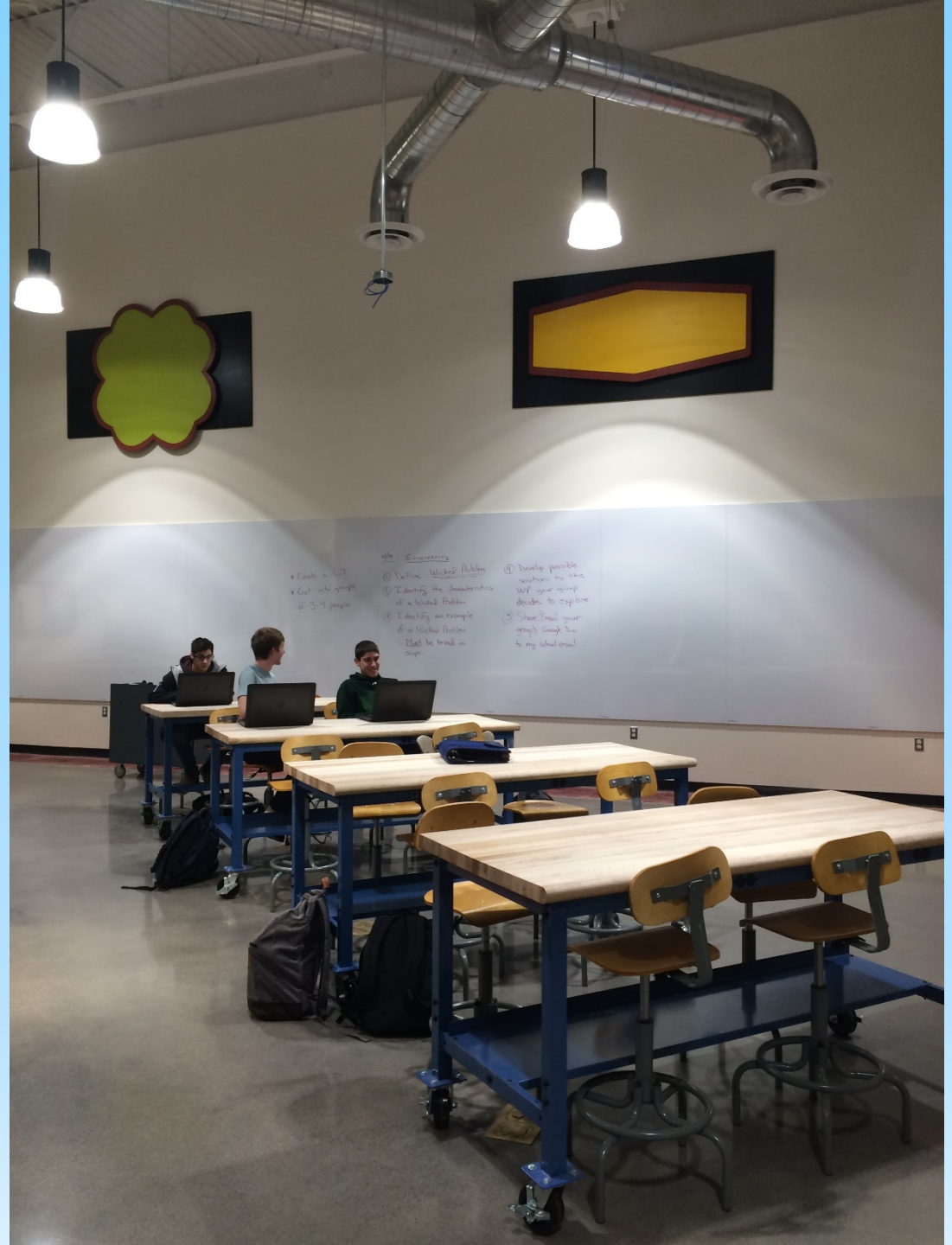
Mount Olive High School

Morristown High School

Dwight Englewood STEM Center

MOUNT OLIVE HIGH SCHOOL

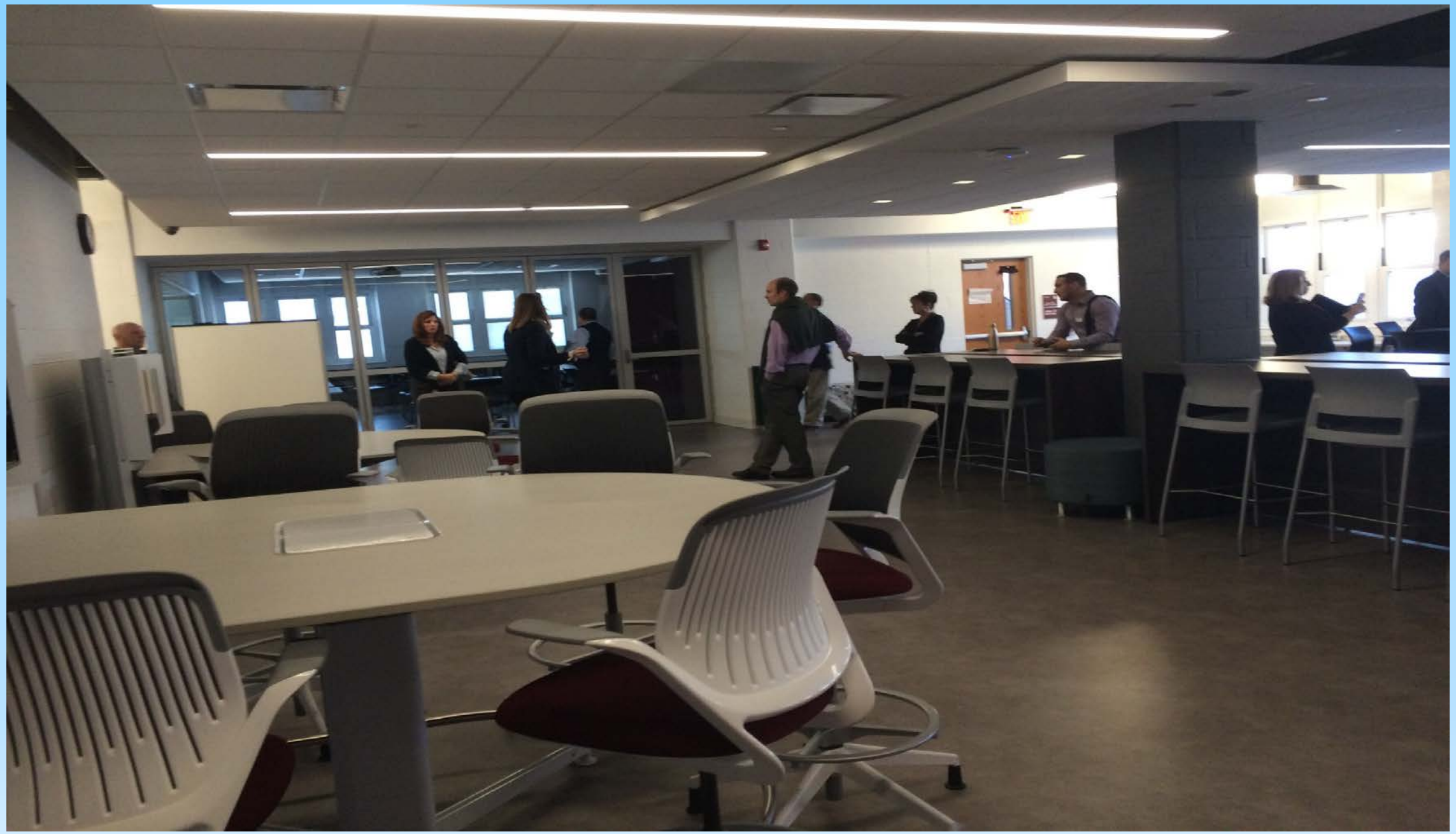

"The Earth without 'art' is just 'eh.'"
UNKNOWN
The MiLL
The Marauder Innovation Learning Lab


11/9 Engineering
① Define Wicked Problem
② Identify the characteristics of a Wicked Problem
③ Identify an example of a Wicked Problem
- Must be broad in scope
④ Develop possible solutions to the WP your group decides to explore
⑤ Share Email your group's Google Doc to my school email

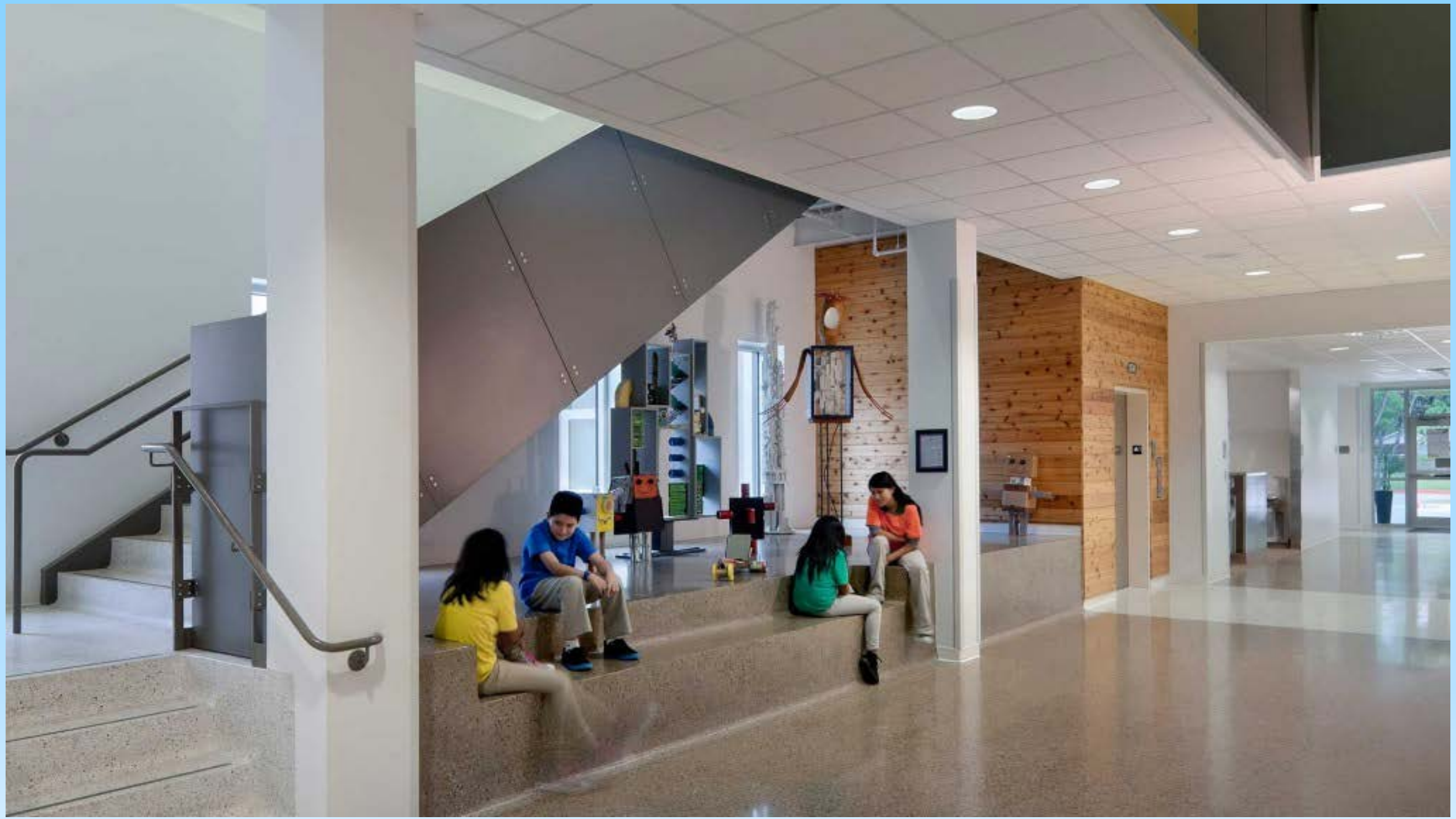

SPACING OF RECEDING FORMS
Linear Perspective
TWO-POINT PERSPECTIVE


MOUNT OLIVE
HIGH SCHOOL
HOME OF THE MARAUDERS

MORRISTOWN HIGH SCHOOL



DWIGHT ENGLEWOOD




TAUB INNOVATION CENTER

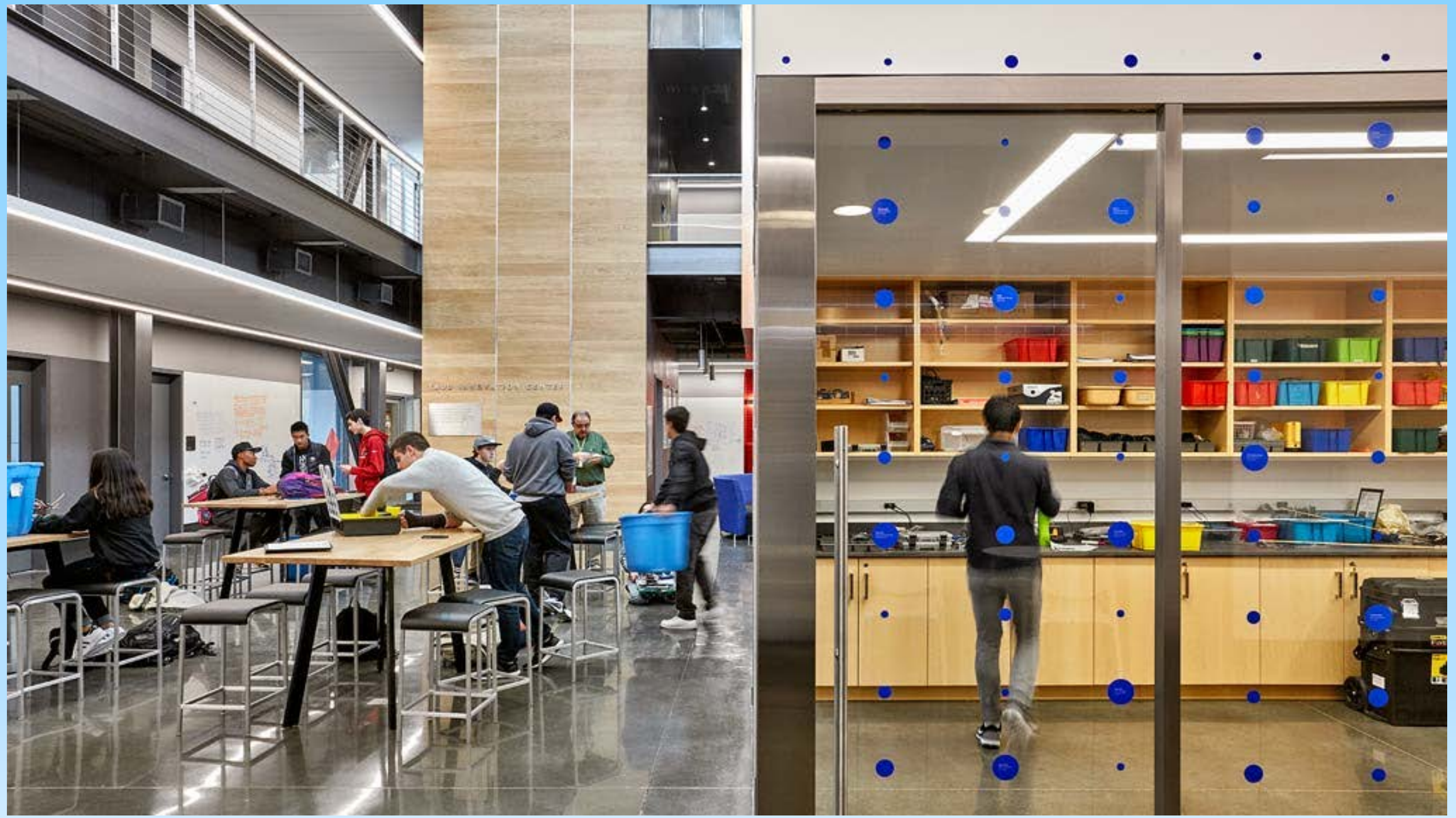



photo:Gensler

Through research and conversations with educators, we learned - and fully support - the following:

“Everything is connected”

- **All STEAM building spaces should be able to serve multiple purposes with furniture that is flexible. The intent is to allow several kinds of activities in an open learning space.**

“Any time is a teaching moment”

- **Learning can and will happen outside of the actual laboratories and classrooms, both inside and outdoors.**

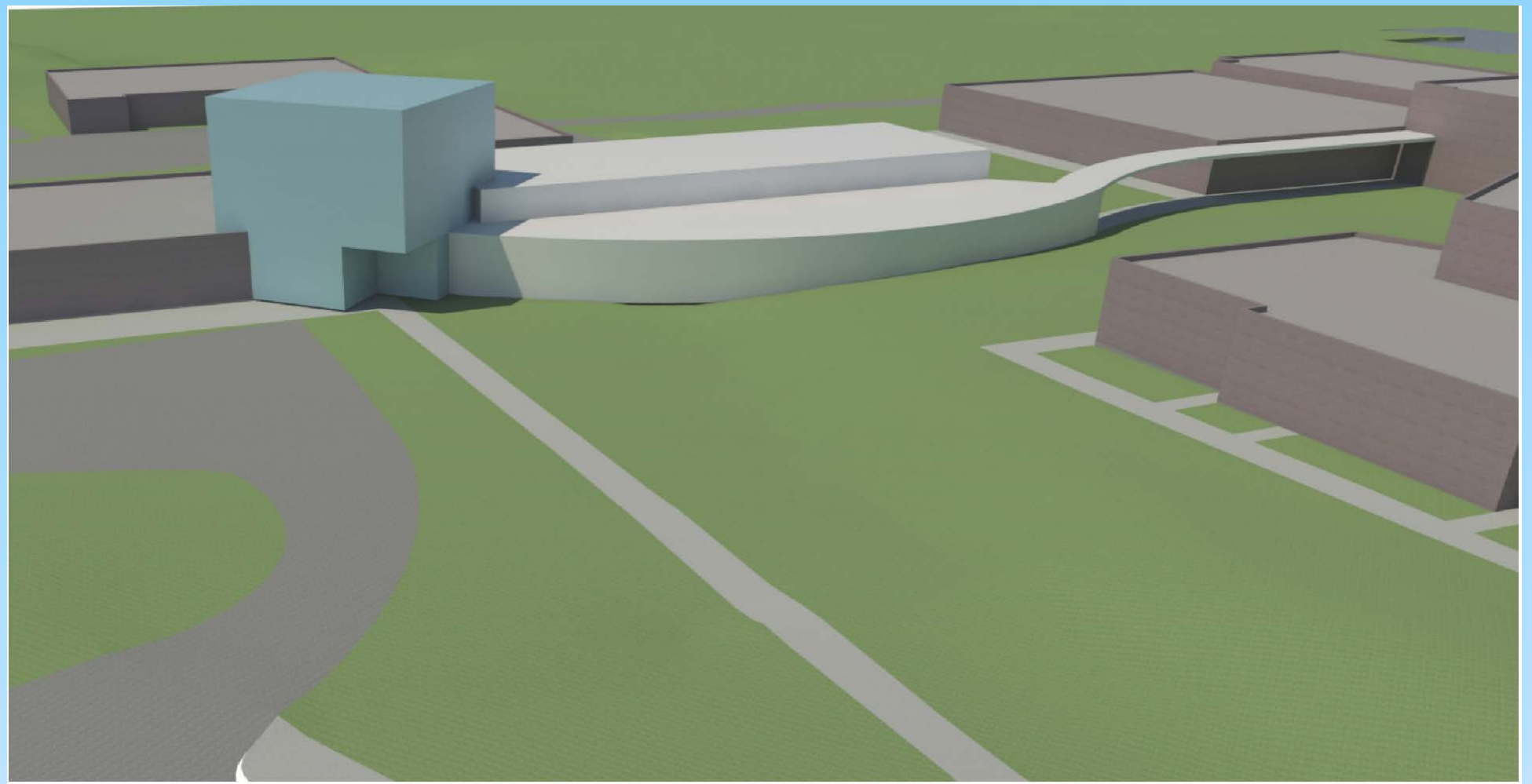
“Learning happens through doing”

- **Students will be best served by multi-zone spaces with maximum flexibility.**

POTENTIAL STEAM BUILDING ON OUR HIGH SCHOOL CAMPUS TO INCLUDE….

- Space for our new Humanoid Robotics course
- An "Open Think Tank"/laboratory (Maker space)
  - STEAM Design and Research, Computer Modeling
  - Honors STEAM Capstone: Independent Research
  - Technology Engineering and Principles
- A professional development room
- A gallery to display student art and projects in a visually exciting way
- Storage and more storage!

A CONCEPTUAL DRAWING



THIS ILLUSTRATION IS FOR CONCEPTUAL PURPOSES
ONLY AND DOES NOT REPRESENT THE FINAL DESIGN.

TOKARSKI + MILLEMANN
ARCHITECTS, LLC

POTENTIAL TIMELINE

PHASE ONE

Schematic Design

- Conduct limited field surveys for verification of existing site features and system locations and conditions as required
- Prepare conceptual floor plans, elevations, and site plans for review
- Prepare budgetary construction cost estimate

Schedule

- Site survey (July 2017)
- Concept plans and estimates for review (September 2017)

MISSION STATEMENT

The Thunderbird Think Tank (T^3), like Mahwah itself, is "the meeting place" – blending science, technology, engineering, art, and mathematics in an innovative way that empowers our students to research, to design, to engage, to collaborate, and to ultimately build visionary ideas and each other.

T^3*: Preparing tomorrow's global thinker – today.*