

2015 Exhibition of School Planning and Architecture

Robert R. Shaw Center for Science,
Technology, Engineering, Arts, and
Mathematics

Category: New Construction

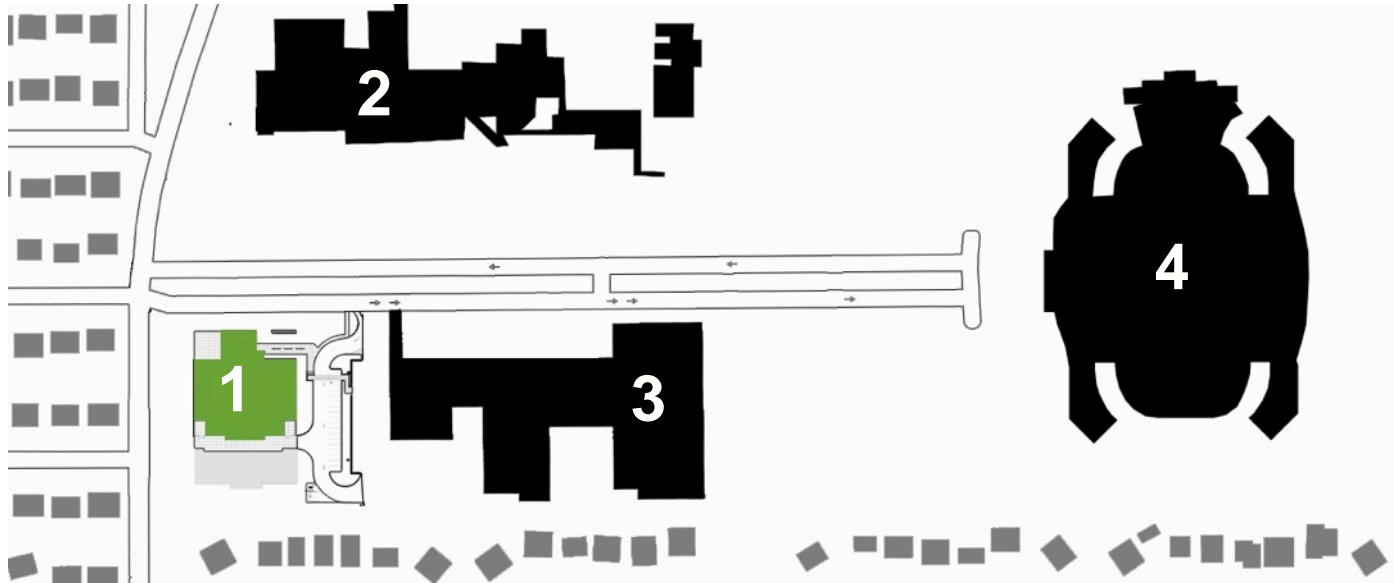
Katy Independent School District

Katy, Texas

Robert R. Shaw Center for Science, Technology, Engineering, Arts, and Mathematics



Robert R. Shaw Center for Science, Technology, Engineering, Arts, and Mathematics



- 1 STEAM CENTER
- 2 HIGH SCHOOL
- 3 CAREER & TECH CENTER
- 4 DISTRICT STADIUM





Community Environment:



A multi-use facility for the whole district

The vision for the STEAM center was to create a unique unconventional learning environment that inspires and empowers students. The design reflects that vision through its flexibility, use of technology, and transparency.

Community Environment: *Continued...*



A meeting of the minds

The STEAM Center brings community, industry, and business partners to the table in defining skills needed to support the science, technology, engineering, art, and mathematics professions.

Community Environment: *Continued...*



Engaging the community in STEAM

An incubator for innovation – for the students, district and community – the learning spaces support STEAM activity engagement without limiting access to space, tools, and knowledge.

Community Environment: *Continued...*



Equal access to learning

Centrally located for District events, the STEAM Center is *the* place for educators, learners, businesses, and the community to connect and collaborate.

Learning Environment:



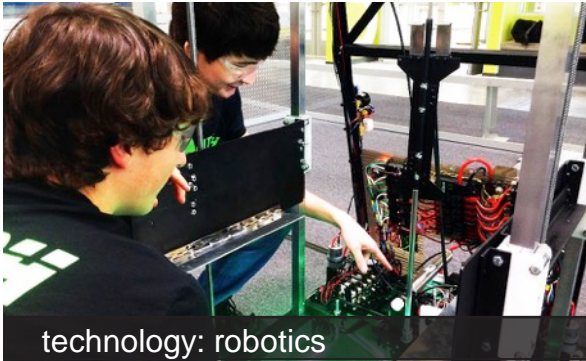
One building, infinite possibilities

While the initial driver for this facility was to provide build space for the existing district robotics teams, the broader objective quickly evolved into designing a facility that would ignite a culture of innovation around science, technology, engineering, art, and mathematics through the creation of an unconventional, unique learning environment that serves students.

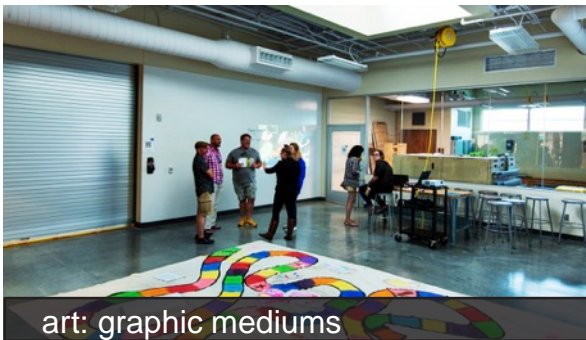
Learning Environment: Continued..



science: sound cannon



technology: robotics



art: graphic mediums

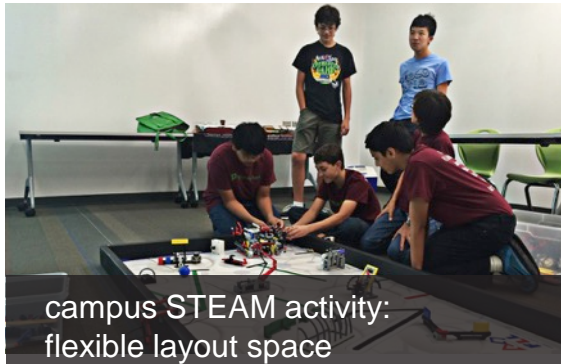


engineering: 3D modeling

Incubator for innovation

The STEAM Center is a place that catalyzes creative relationships, and encourages creativity, communication, collaboration and flexibility. It offers incubator space for the District to redefine their STEAM teaching pedagogy.

Learning Environment: Continued..



campus STEAM activity:
flexible layout space



district robotics clubs:
writeable wall surfaces



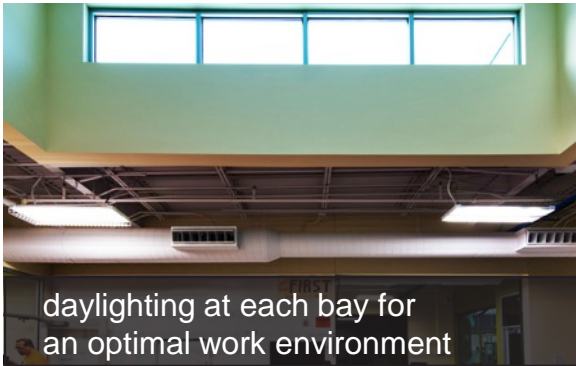
sheriff's forensic camp:
immersive technology



Flexible rooms with a (multi) purpose

In these spaces, you can prototype your work, be competitive, and get messy while exploring new tools and technology. Designing and sharing your designs is encouraged here!

Learning Environment: Continued..



Maker spaces

Eight project bays flank the central high bay space and provide maker space for each of the District's high schools. The storefront view into the central high bay space highlights the identity for each group and fosters collaboration through visual connection.

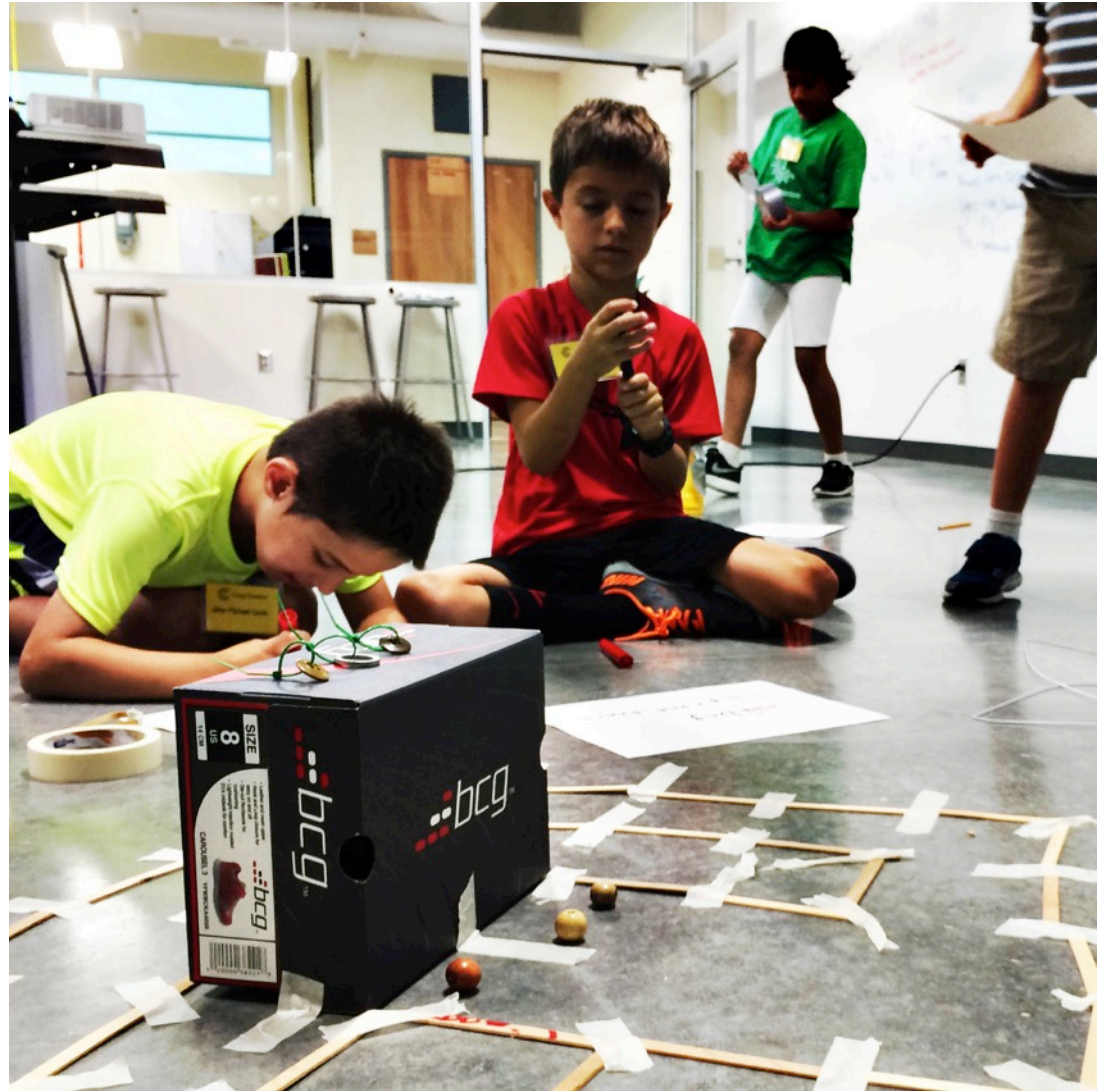
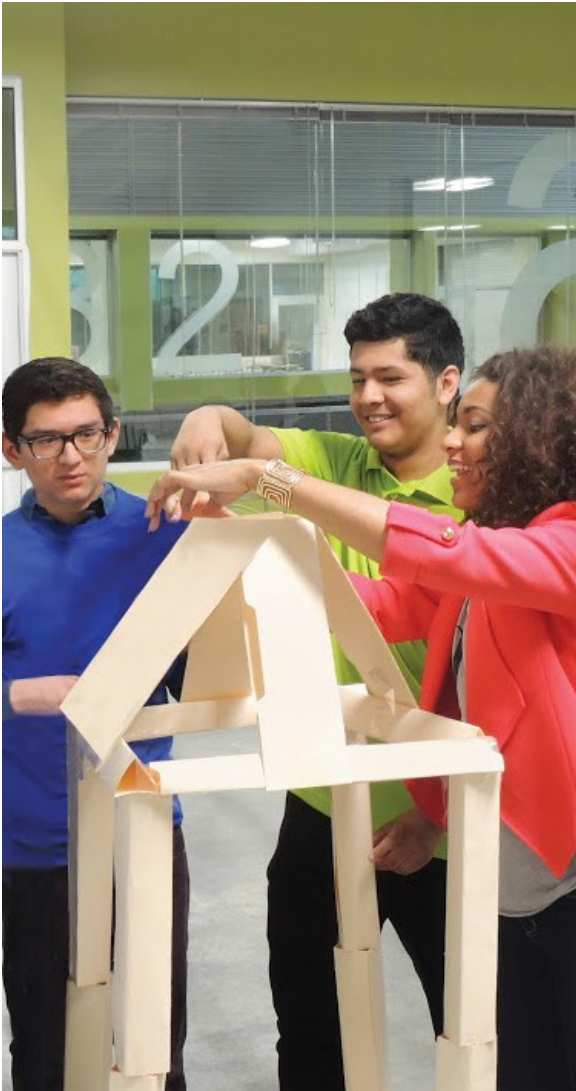
Learning Environment: Continued..



Shared space

The shop / receiving area is shared by the entire facility. It enables students to think, model, and make with access to equipment they would not otherwise have at their fingertips.

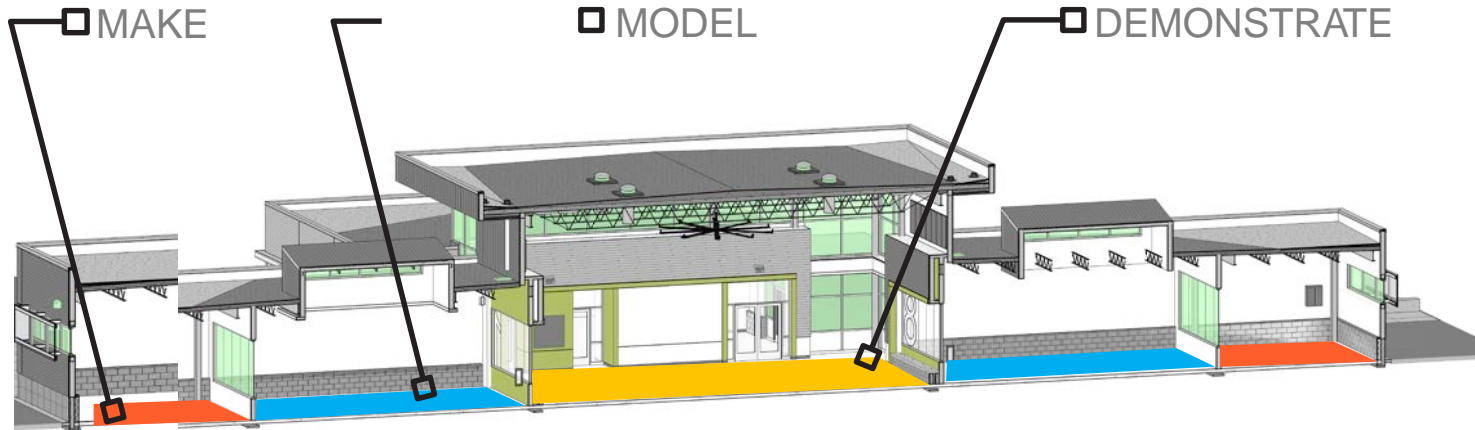
Learning Environment: Continued..



Catalyst for change

Creativity, communication, collaboration, and flexibility are promoted as roles are explored and responsibilities rotated. Teachers will be learners, students will be leaders, and mentors will be collaborators. The forum promotes learners to explore diverse interests through hands-on activities.

Physical Environment:



Making connections

This facility supports many activities—project building, exhibition, competition, community assembly, and professional development. A central high bay space connects 8 project bays with glass walls, supporting collaboration and learning-on-display through transparency. Large overhead doors connect adjacent project bays for flexibility and teaming opportunities. Flex classrooms and a shared shop allow students to think, model, and make with fluid access to tools and build space.



Physical Environment:



Visual transparency

Visual transparency into the core of the building enables students and the community to see internal activities. Each bay has its own storefront directly accessible off the central high bay, creating a highly transparent and collaborative environment where students can learn from each other.

Physical Environment: Continued..



Interactive technology

Technology expands the facility's possibilities, and further promotes its collaborative reach. The walls in the flex classrooms have interactive projection technology in conjunction with extensive writeable surfaces and the video array in the high bay space is used for presentation and interactive communication.

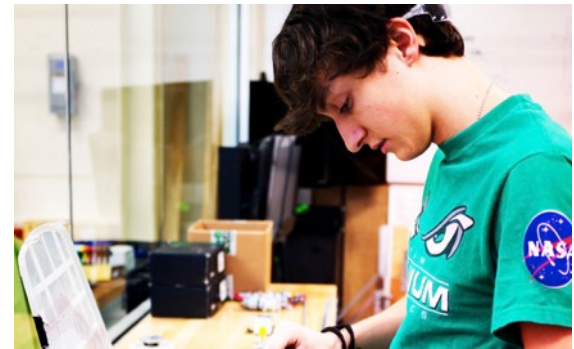
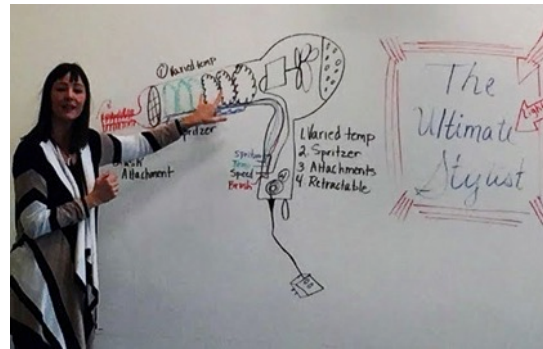
Planning Process:



Working together

The STEAM Center has a fully integrated approach to discovery-based learning that prepares students for a successful future. In early planning stages of the project, stakeholders were engaged through divergent and convergent planning exercises. Activity mapping for future flexibility promoted functionality, flexibility, transparency, and connectivity. Consensus was then built between all stakeholders which led to designing one building with many possibilities.

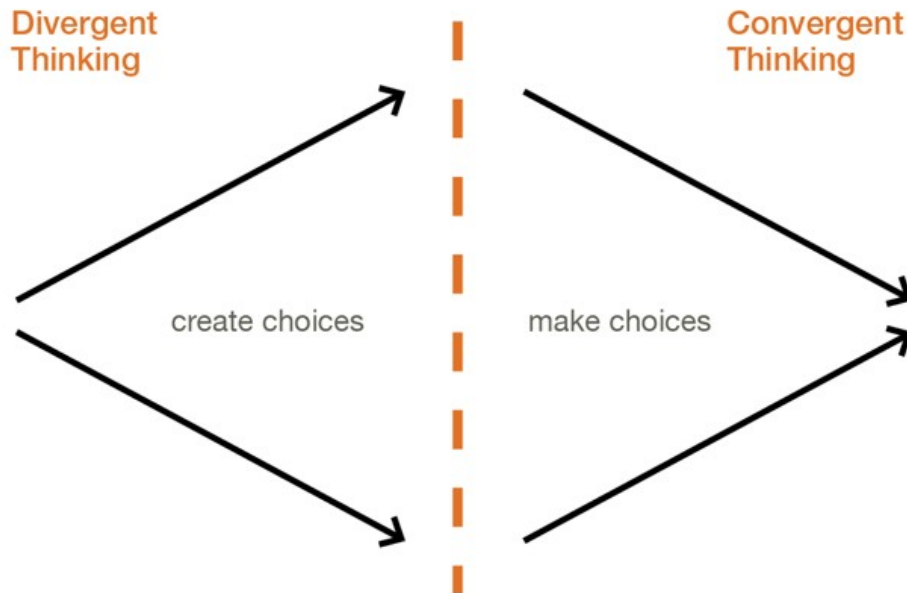
Planning Process: Continued..



Engaging the stakeholders

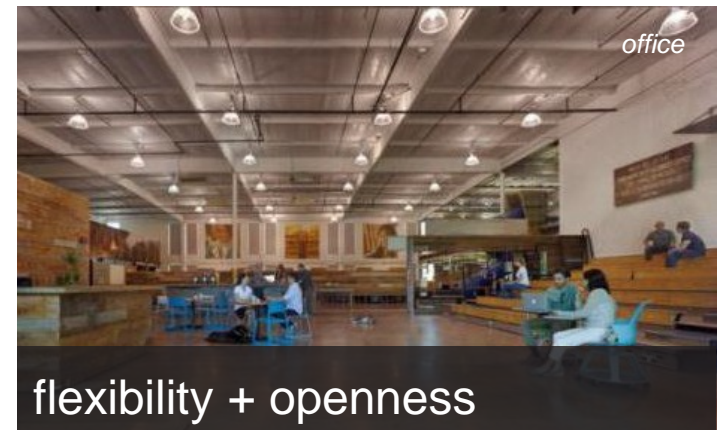
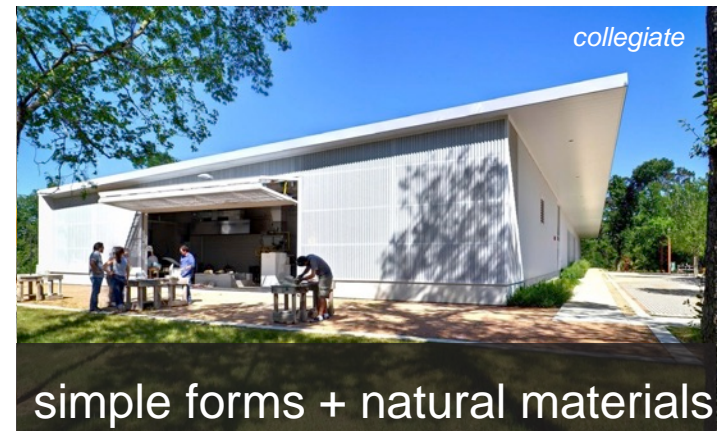
Intensive public meetings with business representatives, district staff, students, and the community engaged diverse stakeholders around the future of STEAM learning and set the criteria for the project's success.

Planning Process: Continued..

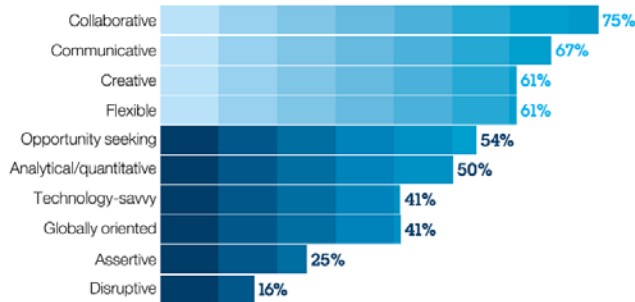


Exploring the possibilities

The group evaluated lessons learned from **outside precedents**, defined Shared/Multi-disciplinary use, and worked better to understand STEAM culture through a look at the other academic and professional environments.



Planning Process: Continued..



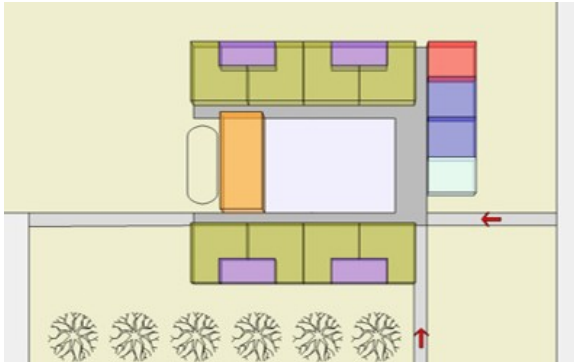
-IBM CEO Survey identified top
“future proof” traits incoming
employees need

	Activities	What activities/events will occur in the space? How often?
	Users	How many people need to be in the space at once? When/who needs access?
	Tools	What types of tools/technology need to be in the space?
	Aesthetics	How would you like the space to feel/look? What should the space be close to?

Activity mapping future needs

The STEAM Center uses a fully integrated approach to discovery-based learning that prepares students for a successful future. The team worked to align the facility with desired learning activities and future-proof skills.

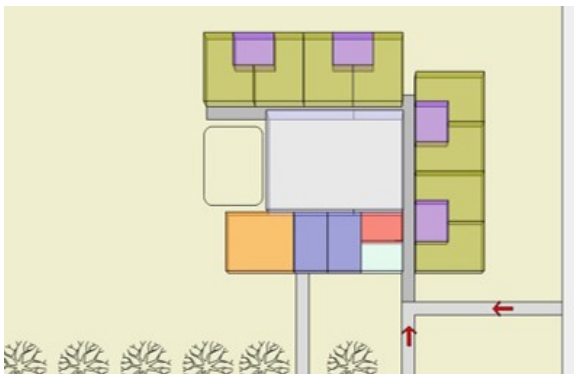
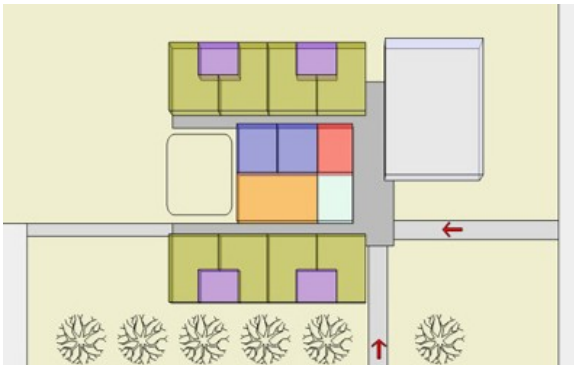
Planning Process: Continued..



Rank by Mean:

- 2.18 Multi-Use Ability/Flexibility of Project Bays
- 2.36 Multi-Use Ability/Flexibility of High Bay Area
- 3.18 Connectivity between Project Bays

← Clear consensus on importance



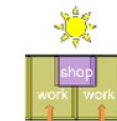
Separate High-Bay



Centralized High-Bay



Views to Outdoors



Connection to High-Bay

Multi-purpose rooms adjacent to shop



Multi-purpose rooms near entrance



Building consensus

The group worked through different design concepts and built consensus by ensuring that the design priorities met the curricular goals.

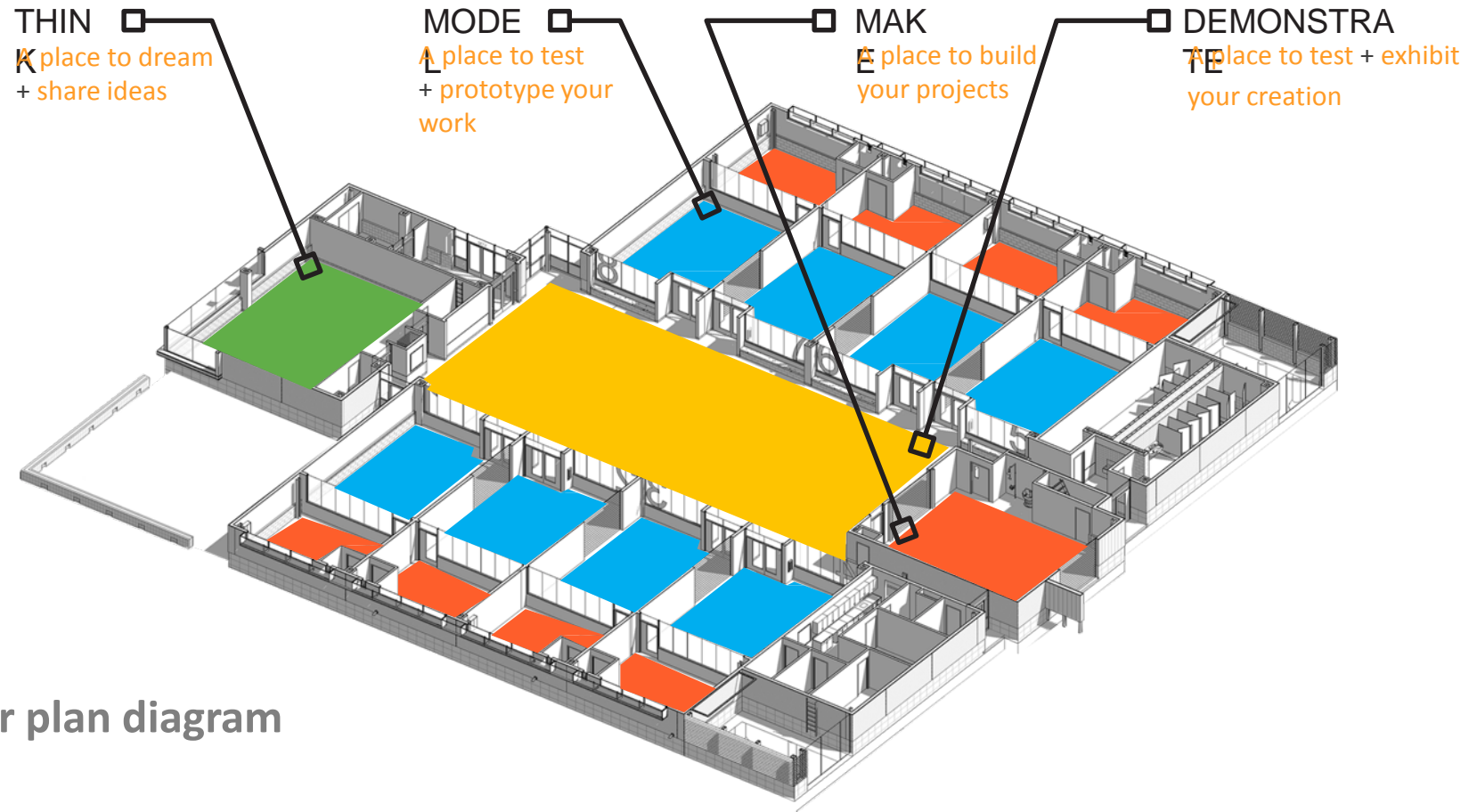
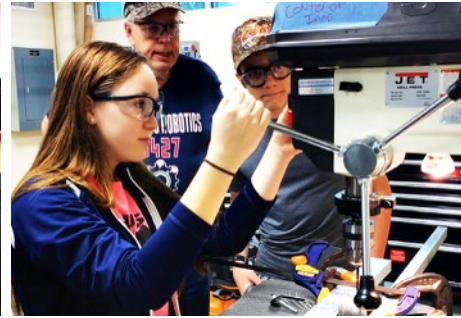
Planning Process: Continued..

- 1** ADMINISTRATION
- 2** FLEX CLASSROOM
- 3** PROJECT BAY
- 4** PROJECT SHOP
- 5** HIGH BAY AREA
- 6** SHARED SHOP



Floor plan

Planning Process: Continued..



Floor plan diagram

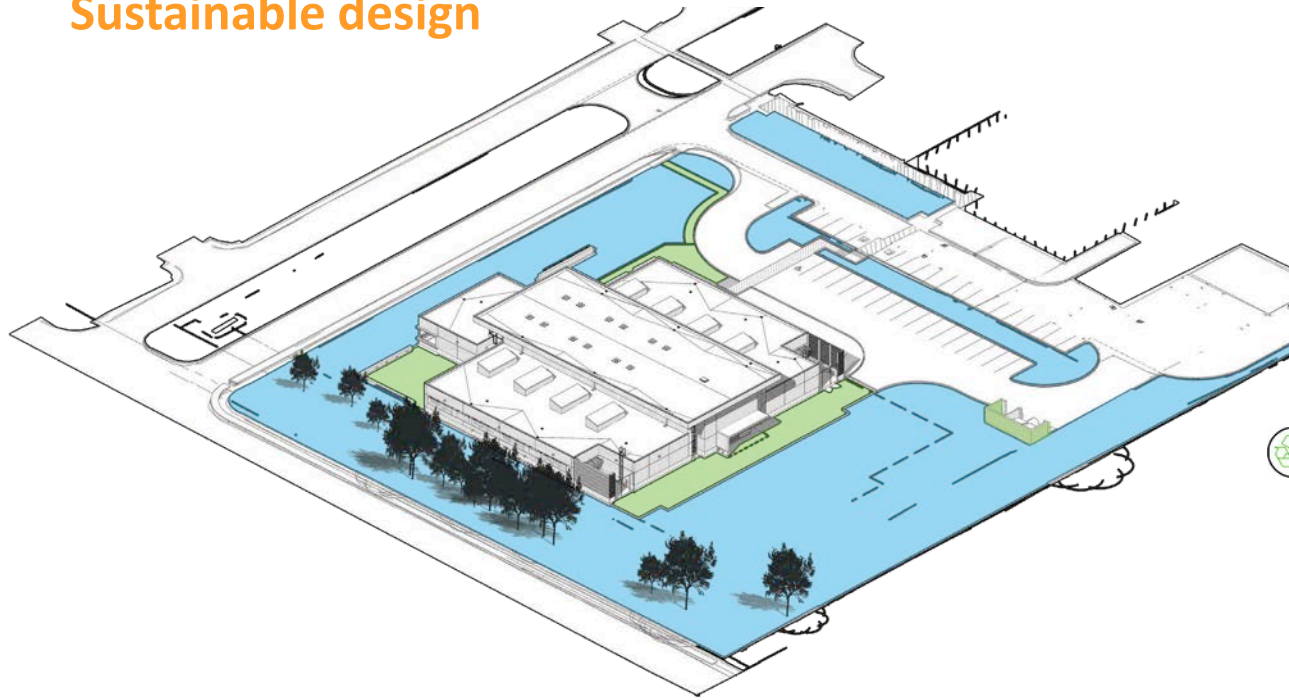
Results



How is the STEAM Center working for the District?

In the first few months of opening, the STEAM Center hosted more than 2,000 students from around the District. A future expansion is planned.

Sustainable design



SUSTAINABLE SITE

- » Minimal parking to promote carpooling
- » Storm-water management
- » White reflective cool roof



LEADERSHIP, EDUCATION, INNOVATION

- » Several integrated design team meetings were held to discuss and implement high performance design features



WATER

- » A water management system and native water efficient plants led to a 55% water use reduction for irrigation



MATERIAL & WASTE MANAGEMENT

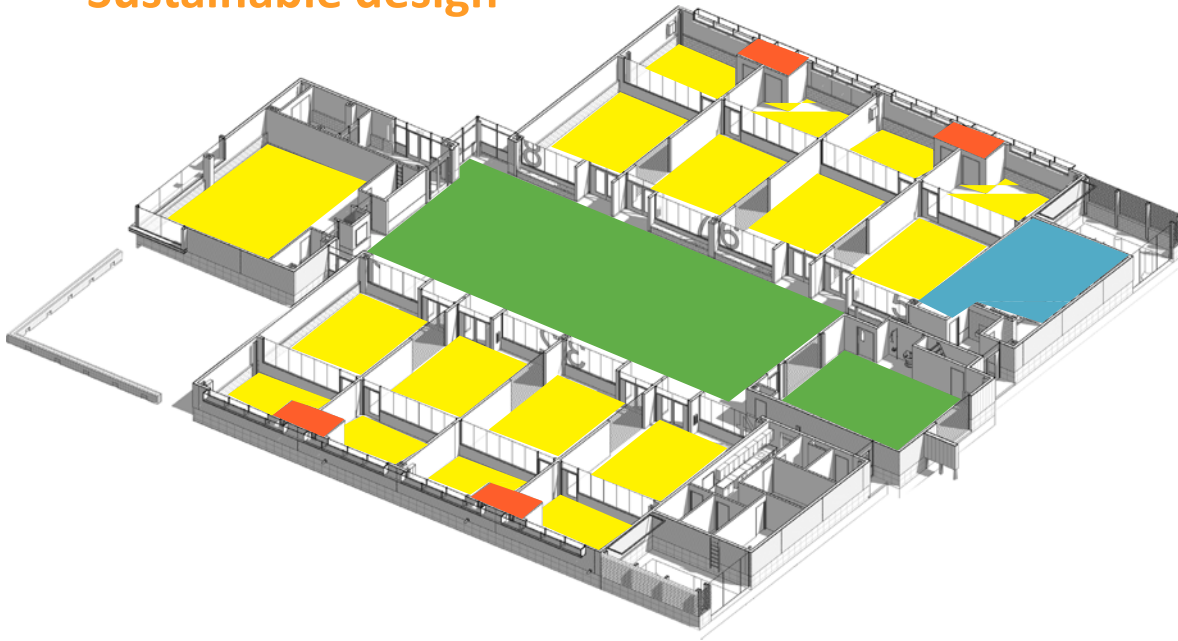
- » 194.5 (93%) tons of waste was diverted from landfills

Texas Collaborative for High Performance Schools

The facility has been recognized as a TX CHPS (Collaborative for High Performance Schools) designed facility and ensures a healthier and more efficient learning environment



Sustainable design



WATER

- » Water efficient fixtures used throughout the facility reduced potable water use by 30% + sewage conveyance by 30%



ENERGY

- » Individual HVAC room control enables energy use reduction
- » District staff trained in energy efficient systems



SUSTAINABLE SITE

- » A joint use facility integrates the community



INDOOR ENVIRONMENTAL QUALITY

- » Visual connection to the outdoors
- » High efficiency lighting works with natural daylight to improve light quality at a minimal energy consumption
- » All high efficiency LED lighting
- » Low emitting paints and coatings
- » Separate exhaust systems control individual bays



MATERIAL & WASTE MANAGEMENT

- » Concrete flooring used throughout the facility is highly durable, low maintenance, and will last the lifetime of the building

One building, infinite possibilities!



Exhibition of School Planning and Architecture

Project Data

Submitting Firm :	Stantec
Project Role	Architect
Project Contact	Laura Sachtleben
Title	Project Director
Address	20 East Greenway Plaza, Ste 200
City, State or Province, Country	Houston, TX 77046-2012
Phone	713.548.5880

Joint Partner Firm:	
Project Role	Not Applicable
Project Contact	
Title	
Address	
City, State or Province, Country	
Phone	

Other Firm:	
Project Role	Not Applicable
Project Contact	
Title	
Address	
City, State or Province, Country	
Phone	

Construction Firm:	
Project Role	Drymalla
Project Contact	Travis Wegenhoft
Title	Project Manager
Address	608 Harbert St
City, State or Province, Country	Columbus, Texas 78934
Phone	979-732-5731

Exhibition of School Planning and Architecture

Project Details

Project Name	Robert R. Shaw Center for Science, Technology, Engineering, Arts, and Mathematics
City	Katy
State	Texas
District Name	Katy Independent School District
Supt/President	Superintendent Alton Frailey
Occupancy Date	January 22, 2015
Grades Housed	K-12
Capacity(Students)	660 - note this is a district-wide joint-use facility. No students are assigned to this facility.
Site Size (acres)	2.7 acres
Gross Area (sq. ft.)	24,000
Per Occupant(pupil)	Not applicable
gross/net please indicate	
Design and Build?	No
If yes, Total Cost:	
Includes:	
If no,	
Site Development:	\$350,000
Building Construction:	\$4.63 Million
Fixed Equipment:	\$7,000
Other:	
Total:	\$4,987,000.00