Case Study

DISCOVERY STEM ACADEMY

STEM

science. technology. engineering. math.

DISCOVERY STEM ACADEMY CASE STUDY

ELEMENTARY SCHOOL IN NEWPORT NEWS, VIRGINIA

RETHINKING TODAY'S EDUCATION FOR THE WORLD OF THE FUTURE

With an eye toward the unique challenges and opportunities of a constantly evolving world, Discovery STEM Academy is changing the game of contemporary education. Dynamic learning spaces, designed to support flexible, experiential, and project-based learning, pair with a curriculum centered on STEM – science, technology, engineering, and math – to prepare students for the future while maximizing their learning experience in the present.

"I think if you look at where we're going in our culture, everything's based around science, technology, engineering, and math," says Erin Weaver, Third Grade Teacher. "STEM's important because it's where our future is going. The physical learning space here at Discovery STEM is so different than other schools. We have a collaborative learning zone, and it's set up for students to go out and work. This place is set up for them to go explore."

This spirit of exploration pervades the space from the moment you step into "Learning Lane," the primary corridor of the school, to the individual classrooms, open laboratories, and an array of outdoor spaces. The core tenet of the design – and the curriculum it's configured to support – is authentic learning through discovery and innovation.


RESERVED
PARKING

DESIGN THAT INSPIRES NEW WAYS OF LEARNING

Completed in September 2016, Discovery STEM Academy replaced the original elementary school on the same site, and the school continues to grow. As Principal Christine Pilger describes, "We are currently a K-4 STEM magnet; we originally were a K-2 school, then we added third grade last year, fourth grade this year, [and will add] fifth grade the next year. And all of our curriculum is focused around integrated STEM curriculum that infuses the STEM design with our state curriculum and real-world experiences, hands-on experiences, and lots of authentic learning. Things that are relevant for kids."

Located in an urban area of Newport News, Virginia, Discovery STEM Academy combines transparent, open spaces with flexible furniture and an abundance of natural light. Key design elements extend indoors and outdoors, where students are able to engage with edible gardens, an Outdoor Amphitheater, and the Outdoor Learning Classroom. Not only are these indoor and outdoor spaces utilized for organized class activities, but they are also made available for students to explore on their own and with others, allowing students to forge connections between abstract and real-world ideas and to discover how they can learn on their own terms.

“The furniture encourages open, fun, flexible learning. Height-adjustable tables and chairs give the kids the opportunity to stand or learn or sit in a way that makes them more focused.”

At the center of each classroom cluster is a Collaborative Learning Zone. True to its name, this space facilitates cross-disciplinary interactions among multiple students, fostering a sense of teamwork and cooperation that is vital to the educational experience. Students are taught to solve real-world problems with creative solutions, all while expanding their knowledge base and developing the capacity and skills to work effectively with others.

At the heart of the design of Discovery STEM Academy is a shift away from the rigid furnishings, static classroom layouts, and overly standardized educational models of the past. Discovery STEM Academy is very different from a traditional school because it is open-ended. As Pilger explains, “The furniture encourages open, fun, flexible learning. Height-adjustable tables and chairs give the kids the opportunity to stand or learn or sit in a way that makes them more focused.”

From individual desks and seating elements to the architecture of the building itself, Discovery STEM allows for an active, inquiry-based approach to contemporary learning that is decidedly future-forward.

A HOLISTIC APPROACH TO CONTEMPORARY EDUCATION

Unlike many educational environments, Discovery STEM seeks to address the whole needs of each child. From interactions with faculty to collaborative projects and individual learning activities, physical and emotional well-being are as highly prioritized as mental and academic performance. Concepts of work and play are virtually indistinguishable from one another in opportunities for students to imaginatively explore their surroundings while engaging in practical problem-solving and hands-on learning.

In developing its curriculum, the school chose to focus on four main pillars of education: leadership, nutrition, fitness, and discovery. These pillars shine through a range of disciplines and activities, which often overlap, mirroring the ways in which an active learner tends to establish connections between disparate fields. As Danielle Joyner, STEM Coordinator, explains: "[The way] all of our units were designed with the curriculum is that they're content-driven. And then we find the reading and math pieces that we can tie in together. And so with the integrated pieces, we're taking the content – which is the real-world things that the kids see applying in their everyday life – and using that to apply their reading and math skills in a way that's intrinsic to them and authentic to them."

Exploration-based laboratory venues, such as the EcoLab, FitLab, Food Lab, Nutrition Lab, and Tinker Lab, serve as holistically innovative spaces where students are encouraged to discover key concepts both within the disciplines of STEM and beyond. To help students engage freely with the material, these spaces are outfitted with dynamic seating, such as height-adjustable PantoMove chairs, ergonomically supportive PantoSwing chairs, and Hokki stools, as well as versatile and adjustable work surfaces that encourage engagement in both individual and collaborative projects.


Good Morning Explorers! Mrs. Warren's class will be doing their lemonade sale on Friday. Be looking for them in the cafeteria. Check out their commercial. This month we are also learning about the citizen trait of compassion. Let's take a look at what

FLEXIBLE FURNISHINGS FOR A DYNAMIC LEARNING EXPERIENCE

At the center of the design and ethos of Discovery STEM Academy is a dedication to truly active, student-centered learning. This principle starts from the smallest details, such as individual reading nooks, flexible furniture arrangements, and RondoLift tables that can be adjusted for sitting or standing. With an array of infinitely adaptable settings, students can move seamlessly between virtual and real-world activities, technology-based assignments, and activities such as reading and writing. With the right tools at their disposal, students intuitively feel comfortable operating in a variety of modes and environments.

As teachers and students alike can attest, this type of endlessly flexible, open environment is essential to authentic, dynamic learning.

"The furniture is conducive because there are wheels, things fit together, there's a lot of different configurations, so it gave me that freedom," says Armetris Howard, a First Grade Teacher. "And it wasn't difficult, I didn't need to call a custodian per se to come and help me, because all I had to do was just unlock the wheels and move it."

Students have an opportunity to engage in a lot of project-based learning and hands-on learning. This emphasis on flexibility is similarly praised by students, who enjoy the fact that everything is adjustable, like height-adjustable RondoLift tables and PantoMove chairs with wheels.

Individual workstations help to promote student engagement in focused activities, while non-traditionally shaped Cloud bean bags promote social interaction in collective settings such as labs and reading areas. Hokki stools are a beloved seating element in several areas and exemplify the dynamic approach to seated classroom activities. "They're fun," says a second grade student, referring to the favorite seating elements in his classroom. "They help you learn, because if you're not focused, they can help you out. If you're wobbling, they can help you to focus."

Other students echo this sentiment. Indeed, boredom is a non-issue for the students of Discovery STEM Academy. By incorporating groundbreaking principles in furniture design and flexible spatial configurations, VS has helped to create an environment as imaginative and dynamic as the knowledge it hopes to nurture.

INSPIRING STUDENT ENGAGEMENT THROUGH VERSATILE ENVIRONMENTS

In collaboration with Grimm + Parker, an innovative community architectural firm, VS provided a varied selection of unique furnishings designed to foster collaborative discovery and engagement through improved focus and well-being. This project arose directly from the real-world needs and goals of students, parents, and educators. And as impressive outcomes in student engagement have shown, the results have been well worth the level of specificity and attention to detail.

According to Paul Klee, Principal, Grimm + Parker, "We had the opportunity to work with the school system to actually develop the learning spaces in this school that tied in directly to their curriculum." This premise turned out to be the cornerstone of a truly hands-on learning approach. Not only are surfaces, lighting, and spatial configurations able to be geared toward the curriculum, but – perhaps more significantly – this connection between environment and learning is not lost on students. A fourth grader points to the fact that "stools that roll help me to not be stressed or bored," and mentions "tables [that] are easy to move because they have wheels" is a way of adapting to whatever task is at hand.

Younger students share this appreciation of versatile classroom environments and seem to have a keen understanding of how flexible furnishings can play a role in improving focus, minimizing distraction, and promoting engagement with the curriculum. A pair of second grade students explain that they "like the bean bag chairs in the library because they are comfortable and keep [us] from getting distracted," while a number of students as young as kindergartners highlight the diverse benefits of the "wobbly" Hokki stools. Varied environments help to reduce distraction, but they also help students to discover what they like best. As a perfect example, a third grade student identifies his favorite places to sit as the bean bag, couch, and "big rolly" chairs, such as the PantoMove, which "help [him] relax so he can learn."

Naturally, this emphasis on a holistic educational setting extends to the design of the building itself. As Kathleen O'Hearn, Senior Associate, Grimm + Parker points out, "We worked with a lot of the teachers closely, developed some educational signage, and tried to tie in things like the building system, the mechanical system, and the structural system, and how could we showcase that for the students." Building on state requirements in an effort to genuinely prepare students for a lifetime of active learning, administrators and educators worked closely with the design team, highlighting opportunities for variety, versatility, and dynamic student engagement. "So when they developed the curriculum as we were designing," says Mr. Klee, "it was a perfect match."

“The learning space is as fluid as the curriculum, or fluid as the day needs to be. It’s driven by the students.”


Punctuation
A period shows the end of a sentence.
A question mark shows the end of a question.
Ex. What time is it?
Ex. Wow! I love it!
Colored Counters
Letter

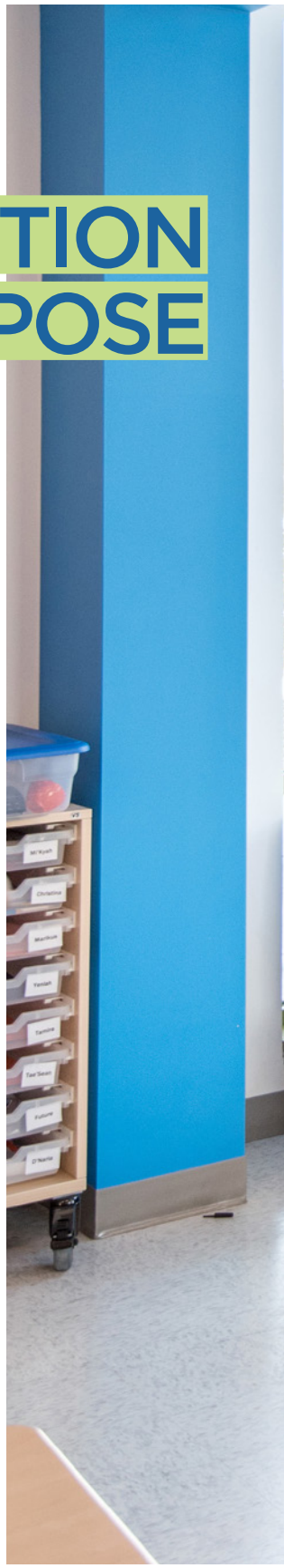
FORM, FUNCTION AND PURPOSE

As a school dedicated to the transformation of elementary education through STEM, the architecture and furnishings reflect unique perspectives on design and its intent. Students are empowered to seamlessly engage with both tangible and virtual media, and learn to function with a coherent approach to nature and technology. While what Superintendent Dr. Ashby Kilgore refers to as a flexible learning environment is key to a student-driven learning culture, it's also helping to prepare students for the real world.

Dr. Kilgore underscores the importance of STEM not only in terms of content, but also with regard to the very nature of learning. "I think it's really important to start the STEM thinking and content at the elementary level because, for one thing, it's very challenging and rigorous. It allows young people to figure out things, [and to engage in] problem-solving and critical thinking." Joyner adds, "We are truly getting our kids ready for their careers, and what their life is going to be like out in the real world."

From spatial design to intuitive furniture, Discovery STEM Academy has sought to create an environment that makes the most of both function and form, all engineered toward the goal of empowering students. As Dr. Kilgore says, "Philosophically, I think, things work on us and we don't even know. If you're in a chair that doesn't move, you're not supposed to move. If I'm in this chair I can move, and I can get up and I can roll it around and I can go to another place. So I think there are these subliminal messages sent by furniture and trappings that say who we can be in a space."

From architects and designers to individual students and teachers, this element of freedom and versatility is key to the success of Discovery STEM. As Michelle Braxton, Fourth Grade Teacher, notes, "The learning space is as fluid as the curriculum, or fluid as the day needs to be. It's driven by the students."



CULTIVATING A PASSION FOR LEARNING IN TOMORROW'S LEADERS

Understanding what makes Discovery STEM Academy so unique has a great deal to do with its emphasis on the future. From flexible learning spaces to individual and collaborative settings, each element of the school is designed to encourage and facilitate discovery. Ultimately, this means that education is geared toward far more than instilling just specific knowledge. Dr. Kilgore points out that "the problem-solving, the critical thinking, and the skills that we call college career and citizen ready skills are going to apply no matter what your next step will be."

Whatever next step students hope to take, an educational experience that prioritizes their well-being – and allows them to develop a genuine passion for learning – is invaluable. And with a forward-looking approach to authentic, innovative, and student-driven learning, Discovery STEM is a powerful reminder that it's not just what you learn, but how you learn. A thoughtful and engaged approach to the world around them is likely to stay with students throughout the rest of their lives.

Principal Pilger admits, "I think I would have been a better student if I could have gone to a school like Discovery STEM." But she also expresses her excitement in helping to create a new generation of active, successful learners. "Just being a part of pulling it all together and working with this fabulous staff to embrace STEM, embrace the design process, and get kids to be better thinkers, stronger thinkers, problem solvers, and passionate about what they're doing, I think that would be the greatest achievement."

Project Profile:
Discovery STEM Academy

Discovery STEM Academy Mission
Discovery STEM Academy, in partnership with the community, will foster an environment of high expectations and knowledge creation to empower critical thinkers, problem solvers and life-long learners through a hands-on, integrated curriculum facilitated through the STEM design process.

Project Team:
School Administration
Christine Pilger, Principal
Dr. Ashby Kilgore, Superintendent
Danielle Joyner, STEM Coordinator
Keith Webb, Executive Director Plant Services
Jack Howard, Facilities Project Manager

Grimm + Parker
Paul Klee, Principal
David Whale, Principal
Kathleen O'Hearn, Senior Associate
Houda Boudjemaa, Associate
Alexandra Struble, Designer

Key Design Principles:
- Student development through a STEM pedagogy can serve as the framework for a school design.
- Curricula and building spaces can integrate to provide a successful student-driven learning culture.
- Students can be engaged in authentic, "real-world" problem-based learning.

Applications:
- 36 classrooms
- Collaborative Learning Zones for each grade level
- Nutrition Lab (kitchen and dining area)
- Fitness Lab (gymnasium)
- Student Gallery and Success Wall for displaying projects
- Two-level Learning Commons with a project-based learning area
- Courtyard with outdoor learning spaces
- Amphitheater with a stage that connects to the Fitness Lab for indoor and outdoor performances
- Individual reading nooks and student lounge
- I-Wonder Walls where students can write questions or engage in online research
- Community resource area
- Edible garden next to the Nutrition Lab

Project Scope:
97,600 sq. ft. (new construction)

Year Completed:
2016

Products:
- PantoSwing-LuPo Chairs
- PantoMove-LuPo Chairs
- Hokki Stools
- PantoMove-Plus Stools
- Rondo Stools
- LuPoStools
- Cloud Beanbag Elements
- Series Lounge
- ClubLounge
- Shift+ Landscape Elements
- Shift+ ThumbPrint Desks
- Shift+ Interact
- Shift+ Transfer Storage
- Shift+ FusionFlip Tables
- FlipTable-TF
- FlipTable-RU
- RondoLift-KF Tables
- NetWork Tables
- Duo-Media Tables
- Series 901
- OfficeBox
- Series 600
- Series 700
- Series 2000 Whiteboards

Awards & Recognition:
- Best Design Award, New Elementary School, Virginia Chapter of Association for Learning Environments (VA4LE)
- Grand Prize Award, *Learning By Design* Magazine
- Silver Design Award, Virginia School Boards Association (VSBA) Exhibition of School Architecture

Photography
Sam Kittner

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art no. DISCSTEM CS 7/01/18 V01