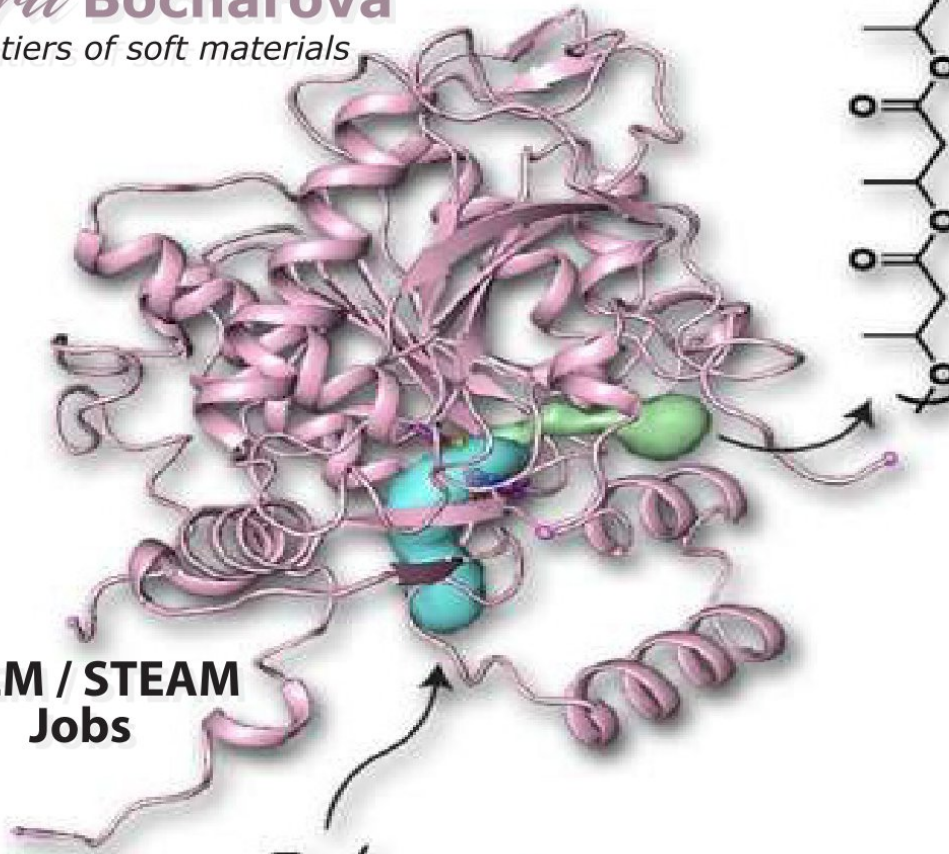


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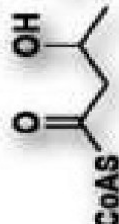
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# US Army Corps of Engineers®

## Army Corps constructs school that's STEAM teaching tool

By JoAnne Castagna, Ed.D.



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Elementary school students are looking out their classroom windows at a nearby construction project and jotting down what they see. They're interested because what's being constructed is their new school that they helped to plan out.

The U.S. Army Corps of Engineers, New York District is constructing a new state of the art elementary school for the children of Army Soldiers and Department of Defense civilians who live on the installation at the U.S. Military Academy at West Point, New York.

The students are playing an active role in the planning out of their school as a way for them to learn about careers in science, technology, engineering, art and mathematics or what is called STEAM.

When completed, it will be an energy efficient structure that will continue to serve as a STEAM teaching tool.

The Army Corps has constructed many of the structures on the historic 200-year old campus. Now it's creating a new school for the Department of Defense Education Activity.





*21st Century Education Bu*

The DoDEA had a paradigm shift in its methodology. It's changing the way teachers instruct and students learn by using a myriad of technological tools to better prepare students for their future.

To help it do this, it's making all of its new schools 21st Century Education Buildings. According to the DoDEA website, this is a school that has a flexible and adaptable design to provide different kinds of learners the environments they need to learn.

"Students learn in different modalities and environments. As educators, we want to create this learning environment for them," said Denise DeMarco, Principal, West Point Elementary School.

### 21st Century Education Building

The new West Point Elementary School will replace an outdated structure that was built in the 1960's. It will serve 509 students from pre-kindergarten to fifth grade and will be located near the campus's middle school and gym.

The multi-story, 95,552 square foot school is being built into the side of a mountain and will have beautiful views of the Hudson River, the river valley and the surrounding forests.

Its design will embrace this beauty as a way to educate students about their region and the local culture. Features that will help to do this include large windows and the use of a wide variety of colored paints and bricks to be used for the floors and ceilings. This will bring the vibrancy of the region into the building.



*Building Renderings 1 and 2*

What will also do this are the interior structures. “For example, instead of having utilitarian staircases, the stairwells will be painted with pleasing colors for a pastoral feel,” said Timothy Pillsworth, Project Engineer, New York District, U.S. Army Corps of Engineers.

Speaking of utilitarian, instead of having corridors with classrooms to the left and right, students will learn in flexible learning spaces called Learning Neighborhoods.

There will be five Learning Neighborhoods. Inside these neighborhoods there will be six learning studios and a teacher collaboration room surrounding a central learning Hub. The studios can be used for large or small groups and one-on-one instruction. DeMarco said, “These flexible spaces will provide teachers an opportunity to be more collaborative in their

teaching and they will be able to group students with like interests, needs, and learning goals.”

Another benefit of these spaces is that it makes the best use of time during a day. Instead of students leaving their neighborhoods to see different instructors, the instructors will come to them in the neighborhoods.

The center Hub area will serve as a seating and learning area and will have a variety of different chairs and tables for students including couches, beanbags, and pillows. DeMarco said, “Some students learn better at a table and chair and others sitting on the floor or on a bean bag.”

In these neighborhoods and throughout the building, there will be moving partition walls that open and close like accordions, allowing the teachers to expand



or limit the areas where they give their lessons.

Also throughout the school, there will be LED light fixtures (Light-emitting diode). These lights will have sensors that will turn off or dim the lights depending on the amount of natural light entering the large windows and if there are people occupying the room.

Natural light will be provided to its fullest. Besides having large windows, there will also be light wells throughout the structure letting in natural light. Besides sufficient light, adequate heat is also important, especially in this region.

To efficiently regulate the room temperature, a special pump system is being set up. Instead of having one big boiler for the entire school, the building will have three smaller ones.

If heat is needed, one of the boilers will run up to 30-40 percent of its capacity. If additional heat is needed, the second one turns on and so on. They will ramp up or down depending on the need. "Smaller boilers work more efficiently when they don't run at their full capacity and they last longer," said Pillsworth.

The boilers will be part of a radiant heating system. Radiant heating systems supply heat directly to the floor or to panels in the wall or ceiling of a structure.

In the school, heated water will circulate through plastic tubing within the floors. Pillsworth said, "When students sit on the floors in the wintertime, the floor will be warm." During the warmer months, the students will have air conditioning - something they never had before - provided by an efficient central chiller plant.

Some of the building's energy will be generated from solar panels and a wind turbine on the roof of the building.

Outside there will be playgrounds for the different age groups, an outdoor patio for art classes and an amphitheater for instruction, gatherings, and performances.

DeMarco said, "Just like children learn differently, they also play differently. Some may want to play ball with a group or they may want to read alone in the amphitheater area."

The Army Corp is also constructing an enclosure that will connect the new school to an existing gymnasium, so the students won't have to walk outside to get to their physical education classes.

In addition, the old elementary school will be demolished and will provide space for a main access drive, bus drop-off, parent drop-off, and 123 parking spaces.

Other features include water bottle filling stations, interior soundproof windows, and a full service cafeteria.

All of the energy-efficiency work the Army Corps is performing on this project meets the environmental requirements to be certified LEED Silver by the U.S. Green Buildings Council.

What also qualifies the project for this certification, is how the Army Corps is involving students in the project, as a way for them to learn about STEAM careers.

### Student Involvement

The students have been involved with the project even before the Army Corps broke ground. Before construction began, trees needed to be removed to make space for the new structure.

DeMarco said, “The students were concerned that removing the trees would harm wildlife.”

She saw this as a great learning opportunity for the students to learn from a real life situation. A meeting was organized so that the students could talk with wildlife experts about their concerns. Together they came up with solutions that safeguarded wildlife and put the students at ease.

Student involvement didn't stop there. Not only did they talk with wildlife experts, they are also performing engineering studies with project engineers and reviewing maps and prints with architects.







DeMarco said that this experience has made many students extremely interested in architecture and planning.

In addition, the students are taking lessons that educate them on what's involved with planning and constructing a new school. This includes listening to guest speakers, including architects, environmental specialist and civil engineers.

"Speakers discussed the removal of the earth to prepare for the building. From this the students learned about slopes and the differences between different soils and terrains," said DeMarco.

The students also have a say on what they want their new school to look like. For example, for each neighborhood, the students voted on a mascot to represent that neighborhood.

The mascots are animals indigenous to that region. Some of the mascots they selected include the Snow Owl, turtle, Black Bear and raccoon. A mural of these animals will be displayed in the entrance of each neighborhood. The students are also selecting the color scheme and furniture for the Hub areas of their neighborhoods, such as couches, wobble chairs, chairs with lumbar support and different table configurations.

While sampling the furniture, one student told DeMarco, 'It's more comfortable to learn in these soft seating areas.'

And now that the school is under construction, there is continued interest. DeMarco said, “The second and third graders, who are strategically located right outside of the construction area, are keeping journals and are making daily entries about the changes they observe week to week.”

The school when completed will continue to educate the students about STEAM careers.

### School as teaching tool

DeMarco said, “The DoDEA 21st Century Education Buildings are designed to be used as a teaching tool and teaching environment. The design teams examined how every square foot in a facility might contribute to education. Building systems and architecture can be used to illustrate and compliment STEAM education.”

When students enter the building, the floor in the main foyer will display the granite that was removed to make way for their new school and to show them what was there before. Eight thousand cubic yards of granite was blasted, excavated and recycled. Some of the rock is being used as fill in the construction and some is being used by the academy.

As they continue to walk throughout the building, students will see colored concrete on the floor with contoured lines, showing them the original foundations or grades. “Students will be able to use these

grades to create topographical maps,” said Pillsworth.

DeMarco said, “So if we are giving a class about geography or topography, we can take them to these contoured floors to discuss it.” In the hallways, the students will be able to see and learn about the building’s internal operating systems.

“There will be glass windows on the hallway walls, displaying the guts of the building, such as the heating pipes inside the walls,” said Pillsworth.

Above them, students will be able to look inside a 20-foot long window, exposing the school’s internal mechanical piping, wiring and cabling systems at work.

“There will be signs stating, ‘This is your chill water pipe where your air conditioning comes from’ and ‘This is a fire sprinkler pipe for fire protection,’” said Pillsworth.

On the roof of the building, additional energy will be generated from solar panels and a wind turbine that the students will be able to monitor.

This will educate the students about renewable energy. “The students will have an energy dash board that will tell them, ‘Hey today is a sunny day or a windy day. We will be generating this much electrical power,’” said Pillsworth.

Outside, there will be a walking path



around a storm-water detention pond. Pillsworth said, “Classes can walk around this system and see the vegetation and animals, and how the system works to protect the environment. It’s also a way for students to see how local plants and grasses can be integrated into construction projects.”

In the spring of 2020, the students and teachers will start to use the almost completed new West Point Elementary School. The students who were once watching the construction from the outside will now be inside experiencing their new 21st Century Education Building.



DeMarco said, “We are very much looking forward to the opportunity to start tours with students and parents. In the interim, we are taking photos and sharing them with the community to keep them abreast of the progress that is being made.

They will be proud to know they helped create their new school. If this experience sparked an interest in a STEAM career, they can further explore it in their new school that is a STEAM teaching tool.

“As the interior walls of the flexible learning spaces start going up, stakeholders are starting to visualize what the school will look like and excitement is building.”