

The Building as the Teacher

By Craig Mason

Learn how a school building is inspiring students, teachers and the entire community to become sustainable citizens.

Teachers educate. Architects design. Students learn. Each serves a specific, unique purpose. But what happens when the three collaborate to achieve a greater good?

In the state of Washington, a school building that is, in itself, a learning tool for students, teachers and the community happened. A school building that inspires students and teachers to become sustainable citizens happened. A school building that is applauded by user groups for its innovative approach to learning happened. And it all happened under one, environmentally-friendly roof at Pioneer Middle School.

“We get a lot more ‘a-ha’ moments because we can physically point to elements in the building and relate that back to our lesson. Students are more excited when they can actually see up close and personal the lesson teachers are trying to explain,” said Laura Lowe, Pioneer Middle School teacher.

“Students seem to really appreciate and value their new school,” said Kristi Webster, Pioneer Middle School Principal. “And as teachers have become familiar with the building, they are using specific building features and spaces as an integral part of their lessons, which is engaging students in new ways of learning.”



Pioneer MS Library: The view of the library is truly a lesson in geometry.

Both walls and the underside of the library slope at varying angles. Skylights allow daylight to penetrate around the floating platform of the space.

A Grant Enhances Sustainable Design

In July 2006, DLR Group was selected as the architectural design firm for a new middle school in DuPont, Wash. The firm began its design process like most other projects. Designers conducted charettes. Peer reviews were performed. Concepts were shared. And approval was granted.

But with the school design well into the Contract Documents phase, potential supplemental funding grants became available for a wide range of projects as part of the Washington Sustainable Schools Protocol (WSSP) program. WSSP is a continuation of the State's commitment to developing sustainability in schools.

DLR Group collaborated with the District and submitted the grant application for Pioneer Middle School, which received the highest amount available to a new middle school, \$350,000.

"As part of the application we presented an innovative approach, our signature idea that set us apart from the other districts applying for the grant," said Erin Reichman, Project Manager with DLR Group. "We wanted to make the school building a tool for teaching sustainability and instilling environmental stewardship in the next generation."

The WSSP funds allowed the district to incorporate a more robust level of sustainable design into the new school. In collaboration with DLR Group, teachers and staff made a strategic decision to design sustainable elements within the building and develop a focused curriculum around these features. The catch for the design team, challenged by the timing of the grants and the status of the project, was working with the school staff to find creative ideas that could be implemented late in the project design.

"The WSSP grant was a great opportunity and a significant boost for the project. The district and design team worked quickly to pro-

duce curriculum pieces that highlighted the existing and added new sustainability aspects in the building," said Reichman. "A majority of the mechanical and electrical systems were already designed for energy efficiency, but the materials and technology were enhanced to solidify the building as a learning tool with the additional funding."

Design Collaboration

DLR Group issued a memo to Pioneer Middle School staff in September 2006 summarizing the recommended design elements and strategies for incorporating sustainable applications into the curriculum. The initial summary then triggered educators to respond and expand the list of how the sustainable elements in the design would be used in daily lessons.

"At first there was a flurry of activity to figure out how to integrate the design into our curriculum," said Lowe. "The design process was already underway, but after the grant was received DLR Group needed input from the teachers and staff on ways to modify their plans to meet qualifications of the grant."

The district identified a core design team of two teachers and the Principal to collaborate with DLR Group designers. In November, this group gathered to strategize implementation of a new curriculum at Pioneer Middle School, which supports sixth, seventh and eighth grade levels.

"Teachers and staff were excited about the opportunity to work so closely with the designers. In the beginning we were all part of the brainstorming sessions, but later a core group of teachers and administrators became the voice of the district," said Lowe. "My colleagues and I provided input based on our knowledge of the state standards to ensure the new Pioneer Middle School would meet state curriculum requirements."

DLR Group and Pioneer staff communicated regularly about the

curriculum, with each correspondence advancing the building as a learning tool concept.

"The district offered ideas to DLR Group, and after evaluation, DLR Group designers responded with new or slightly expanded ideas. Our job was to inform DLR Group what would support the state curriculum requirements, and what needed to be tweaked," said Lowe. "We had a lot of back and forth communication, which in the end really solidified the school as a great learning tool."

"The Pioneer staff corresponded with the project team right up to the bid deadline, and with each new idea or revision we issued an addendum to the contractor," said DLR Group's Reichman. "We encouraged feedback from teachers throughout the entire process, and through open communication and collaboration we were able to deliver a novel approach to learning."

The teachers did what they do best during the collaborative process, they educated. They provided information and resources necessary for DLR Group's complete understanding of the curriculum requirements.

"Working with DLR Group designers was a positive experience. They were very open to our ideas, and when they didn't fully understand a concept, they would go out on their own to research a topic and how it applies to middle school curriculum," said Lowe. "The design didn't happen in one pow wow because one meeting was not enough time to tackle all of the issues and curriculum elements we wanted included in the building."

Multiple brainstorming meetings were critical to the success of the final design. By extending the design process over several months, DLR Group was able to digest and research exactly what teachers were asking to be implemented in the design. The district's core design team also was able to dig deeper into state standards.

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The process of creating a composting space is easy and cheap. The location of the composting space contributes in a major way to the success of the composting process. Placing a compost pile in the sun in our temperate region helps to increase heat which speeds the process of decomposition.

There are several ways to produce compost. One way is vermicomposting. Vermicomposting is composting using worms to feed on and decompose the waste. This process is best for food scraps, paper and yard waste because the waste is consumed quickly, reducing the odor created from decomposition. This process would work well for this school.

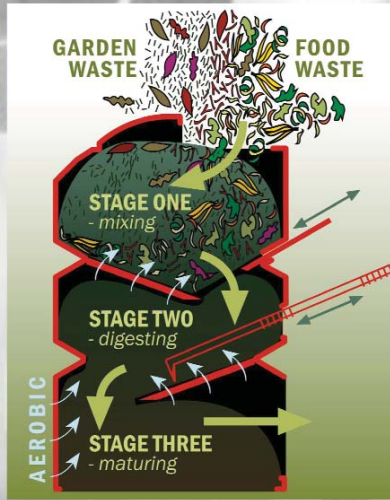
Food Scraps are mixed in:

Worms Digest the Food Scraps:

Temperatures rise with decomposition:



Reuse



signs for each subject. These signs are color coded to reflect a specific subject: yellow signs = math; green signs = science. Teachers were provided templates so they can implement signage messaging into lesson plans, and easily create new signs for future displays.

The signage package allows visitors and students to learn how local resources were used to build their school; ways they can recycle and reuse

Pioneer Signage Sample: Signage displayed throughout the middle school illustrates the underlying theme of the school: environmental stewardship. DLR Group provided teachers the templates so they can implement signage messaging into lesson plans, and easily create new signs for future displays. (Signage courtesy of DLR Group)

A Building Equipped with Sustainable Applications

Construction was completed in August 2008, just in time to welcome students for fall classes. Prior to the start of the school year, DLR Group once again organized a group meeting to train teachers and all school staff on the rationale behind the design of the new building. Rather than lecturing the staff on the actual building systems, DLR Group designers walked teachers and staff through the design process.

"We explained how the systems work and how each staff member could interact with the building for maximum results," said Reichman. "Our designs don't come with a manual, but we were able to use signage to illustrate many of the sustainable and learning points we wanted to highlight within Pioneer Middle School."

Building Signage

Signage illustrating sustainable elements of the school unifies the site and allows visitors to grasp the underlying theme of the school: environmental stewardship. The signage demonstrates how the design reduces the school building's environmental impact and how students can further engage in sustainable practices.

A concern of educators throughout the process was how their curriculum evolves over time, so any graphic displays needed to be flexible.

"DLR Group originally proposed a simple graphic to display learning points of each specific space," said Reichman. "But after our meeting with the teachers and staff, the building's signage took on a whole new life."

Teachers shared curriculum components for core subjects at each grade level, and many of these aspects were used in the signage displays.

"In science we study the diversity of life, so we wanted to incorporate diverse natural features in their habitat. I asked for signage explaining the features and why they are important," said Lowe.

DLR Group prepared an entire graphics package with multiple

everyday products; educational performance and personal benefits of natural daylighting; and how to reduce waste through composting.

Interactive Touchscreen

A priority of the district was to educate students, staff, and the community about energy conservation, specifically the impact of routine activities and individual habits on energy use. The design solution is an interactive energy measuring device that provides students with water, gas and electricity data, as well as past/present weather information.

This "green touchscreen" is prominently positioned at the main public entrance. A network of energy sensors throughout the building streams constant energy consumption data to the touchscreen display that is accessible by students, staff and visitors. This data is readily accessible at all authorized computers throughout the school.

Teachers had ideas of how to use the device to enhance their individual lesson plans. After an initial meeting to discuss the touchscreen, DLR Group coordinated two webcast sessions between the manufacturer and Pioneer Middle School educators to finalize design plans for the tool.



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Pioneer MS Touchscreen: The touchscreen device provides easy access to current events, energy metering data (water, gas electricity) and weather data. Teachers and students can utilize this technology to explore responsible energy usage within the building.

“A colleague and I have discussed teaching graphing by joining a nationwide rain collection and temperature data collection effort based in Colorado,” said Lowe. “We could put rain gauges in campus gardens to be a part of their data collection. Students could then create graphs both by hand and electronically over the course of the year looking for patterns. This is a great opportunity to take advantage of both the school’s technology and outdoor environments.”

Outdoor Learning

DLR Group designed outdoor teaching spaces in its original design, but teachers identified additional opportunities for outdoor learning.

“In 7th and 8th grade science, students learn more about earth science in their astronomy studies. They learn how the sun moves over the course of the year, so we recommended a sun dial to allow kids to track the sun throughout the year,” said Lowe.

The design team perked up at this request because designers often research sun angles and the sun’s effects on a building. A sun dial also has practical applications; it demonstrates to students the lessons they are learning are relevant in the real world.

DLR Group initially proposed a teaching garden, but teachers enhanced the idea by providing a plant list for the garden they could incorporate into their dissection curriculum. In collaboration with landscape architect Aspen Design Group, the design team created a working garden and a world history herb garden for science and food-lab instructors. The herb garden is divided into sections representing different eras and the herbs that would have been prevalent during that era. The Renaissance and Age of Discovery herbs include chives and parsley, while the Eastern Asia and Pacific garden includes bronze fennel and ginseng.

“The ability to take the classroom outdoors adds variety,



Pioneer MS exterior: Pioneer Middle School introduces an innovative approach to learning. The entire building is used as a teaching tool for both students and the community.

engagement and connections to classroom lessons,” said Principal Webster. “Some teachers have already made use of the garden as part of their curriculum.”

The End Result

Pioneer Middle School is the result of a truly collaborative effort among staff, teachers, designers and project team. Teachers embraced and expanded DLR Group’s original design idea and customized it for their specific subject. And the building itself is an effective teaching tool that allows kids to make an immediate connection to a specific lesson.

“If I want to explain about native plants and different shapes of leaves, and how that works with photosynthesis, I can walk right out to the garden and show the kids on the spot. Besides the fact students are so happy to be in a new school, they seem to be more engaged and connected,” said Lowe.

“What’s been especially fun is that some instructors are even using the building in ways we didn’t necessarily intend, such as the PE instructors who are using it in unexpected ways as a fitness tool,” said Webster.



Pioneer MS Garden: Outdoor teaching patio and gardens provide additional learning resources for Pioneer Middle School students. Edible food and herb gardens separate each classroom wing.

“By including so many sustainable features in our school, we have created a culture with the students that we didn’t have before,” said Lowe. “Even in the other schools where we recycled, the concept of protecting the environment wasn’t to the level it is at the new school.” ■

Photographer Credit: *Chris J. Roberts Photography*

Craig Mason, AIA, LEED AP, is a Principal with DLR Group and the Education Studio leader for the firm’s Seattle office. He has served as a senior design team member for a number of award-winning educational projects around the country.