

## We built this city

BY NANCY KIMBALL  
*The Daily Inter Lake*

A handful of Semitool engineers and Montessori junior-high students have a new mutual appreciation after their meeting at Zeymous.

Zeymous is an Icelandic fuel-cell-powered future city whose 200,000 residents capture the sea's energy to supply hydrogen for their fuel cells, zip around the city in the mass-transport Zeyball tube, live in dome-covered dwellings, grow and export organic vegetables and appreciate the fine arts.

More accurately, Zeymous is a conceptual model of such a city.

It's designed and built by budding engineers Kat Delby, Sam Watson and Brenton Tartaglino, all eighth-graders, and Ellie Eberts, a seventh-grader.

When Semitool mechanical design engineer Dan Woodruff, mechanical engineer Kyle Hanson and systems engineering manager Steve Eudy took a look at Zeymous on Dec. 18, they peppered the teens with questions that could point up the weaknesses in their design.

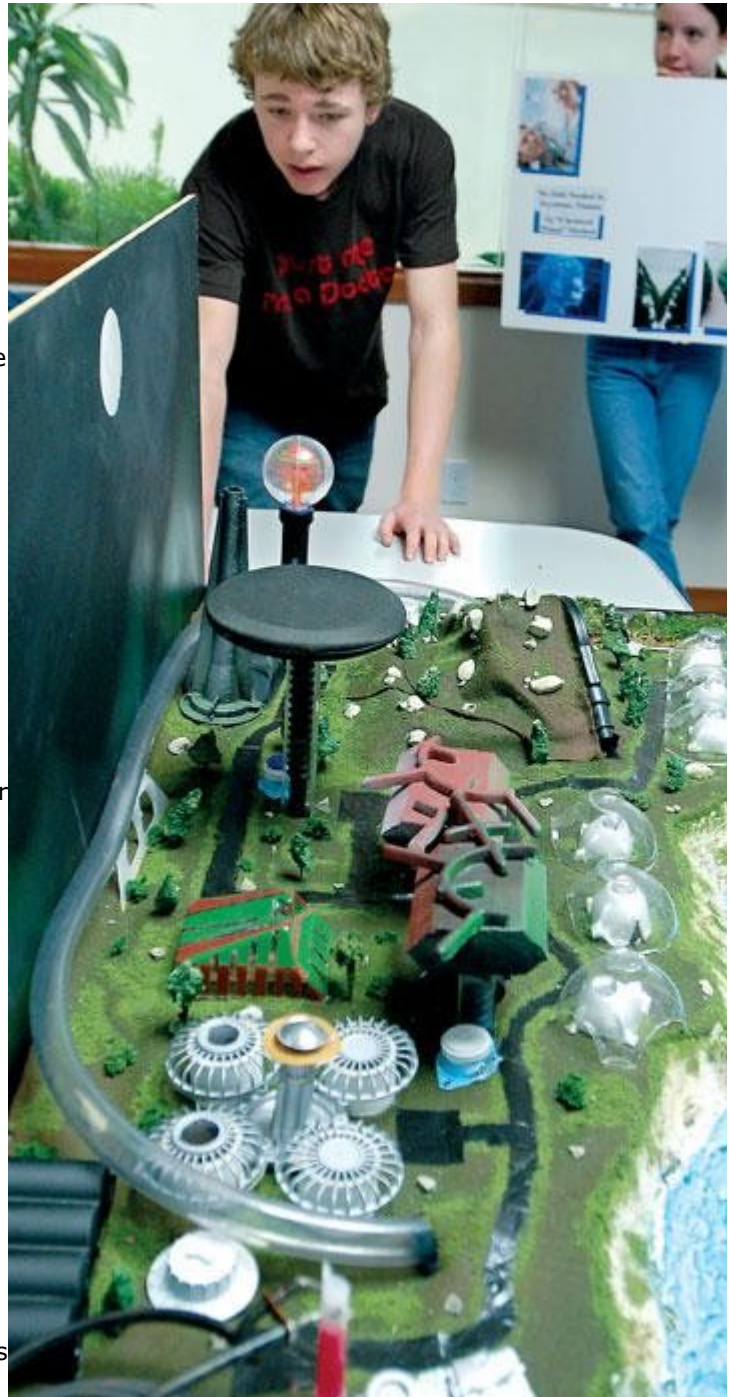
That's exactly what the students wanted.

They also got something else they had humbly hoped for: Kudos from the engineers.

"This is a small town with high technology," Tartaglino introduced his team's model city.

Teammate Watson explained that Zeymous harnesses water, solar and wind power, then liquefies its hydrogen and pipes it to every home for on-demand energy supply.

City founders encourage citizens to be creative, whether in home design or public



Watson powers up the Zeyball tube on the city of Zeymous. The tube serves as the mass-transport system for the futuristic model city of 200,000 people. On the right is Ellie Eberts, who will serve as an alternate for the three-person team. Karen Nichols/Daily Inter Lake

art, Delby added.

"It is important to display their art and culture," she explained. "It reminds the citizens of their history and their future."

The four students spent the better part of this fall, the pilot term at the new Flathead Valley Montessori Academy, researching, designing and building their entry for the 2007 National Engineers Week Future City Competition.

For the past 15 years, it has challenged students to take a current issue — this year's focus was fuel cells — project it 150 years into the future, and work out the logistics for an entire city.

The students researched every angle imaginable — energy source and delivery, transportation, food production, retail locations, home design, water and sewer systems, crime, education and more — then wrote two in-depth essays and produced the model city for a budget capped at \$100.

"There was a lot of Dumpster diving," Eberts said, explaining the mix of found material, donated items and \$60-\$80 of purchases that went into the model.

On Jan. 6, the team travels to Boise, Idaho, for regional competition. Team size is limited to three, so Eberts will serve as their alternate.

To get ready for that competition with 32 other middle-school teams from Idaho, Utah, Oregon and Montana, they first did a practice presentation to Montessori elementary students.

On Dec. 18, they called in the big guns.

Semitool's Eudy, upon a parent's request, lined up Woodruff and Hanson to provide the critical eyes and ears that judges likely will have at the Boise competition.

Because each family's organic garden is the city's "pride point," for example, where will the fertilizer come from?

Law-enforcement's plan for "chemical incarceration," injecting criminals with the intense memory of having served prison terms instead of providing physical cells, would assume a society stripped of many freedoms we enjoy today, would it not?

kkellogg 12/28/06 What technology would be used to "loosen" molecular bonds in water to free up the hydrogen for fuel cells? How much system efficiency is lost through the central distribution system? What are the issues of building a city so close to the shore, with its accompanying tidal action?

Where is the city's supply of fresh water? The fuel cell's byproduct water would leach minerals from a human body, so will the fresh-water reservoir be adequate?

kkellogg 12/28/06 Will each home's individual dome encourage urban sprawl? How will population be limited? Where will city parks go?

What is the city's taxation rate? How might people work differently to harmonize with the transportation system? What would you have done differently?

After the rigorous but friendly grilling, the engineers calculated a numerical score by combing through four pages of criteria covering creativity, accuracy and scale, infrastructure, moving parts, model quality, use of recycled materials, presentation, overall knowledge of their material and team cooperation.

From these, 120 points were possible. The engineers gave the Montessori team 90 points.

"These four are a very strong team together," school co-founder Stephanie Pernell said.

Her husband, Jeff Pernell, president and co-founder, worked closely with the team as they developed the project. So did Watson's father, Jim Watson, a mechanical engineer and entrepreneur who now ranches.

Contest rules require the guidance of a teacher and volunteer mentor.

The students worked with "Sim City 3000" software to help design the model, and drew from their own skills to work as a team.

Delby contributed her artistic talents and sensibilities, Watson generated ideas and larger engineering concepts, Tartaglino was the mechanical expert who did the soldering and directed the parts assembly.

Ebert and Watson are creative problem-solvers, Jeff Pernell explained. Both Montessori-educated from elementary grades on up, they have developed the ability to think on their feet — another contest essential.

"The group went back after their presentation and brainstormed other possible problems" that could arise when the model gets its Boise debut, Pernell said. "They decided the engineers really wanted to know numbers, so they came up with other potential numbers that might be asked," such as comparisons between crime rates in Zeymous and Boise.

These real-world problem-solving exercises serve the students and society on several levels.

Primarily, though, students think through a problem in-depth and learn to think on their feet. The engineers, and ultimately society, get to pick these young brains and come up with new ways of looking for solutions in everyday situations.

"Fuel cells are what we're all hearing about," Pernell said, "so they said, 'Let's get these young minds involved in thinking about these things and see what we can learn.'"

If the team wins regional competition — Pernell is predicting at least a top-five finish — they advance to national competition in Washington, D.C.

"It's so exciting, I can't wait — and the kids, too," he said. "It's so much fun. And they continue to impress me."

Reporter Nancy Kimball can be reached at 758-4483 or by e-mail at [nkimball@dailyinterlake.com](mailto:nkimball@dailyinterlake.com)