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Can origami teach students geometry? Local teacher says absolutely.

By **TheWeekly**

**BY ARDEANA HAMLIN
FOR THE WEEKLY**

BANGOR — Icosidodecahedron isn't a word that trips easily off the tongue, but students in teacher Eva Szillery's modular origami class are sure to encounter it.

They also learn that, geometrically speaking, an icosidodecahedron has 20 triangular faces and 12 pentagonal faces.

It has 30 identical vertices — or points of intersection — with two triangles and two pentagons meeting at each intersection, and 60 identical edges, each separating a triangle from a pentagon.

It sounds complicated, but this is geometry that students young and old can get their hands on and that's where the art of paper folding — origami — comes in.

The students learn to fold squares of ordinary printer paper to create spherical, wreath-like, cubical and other geometric shapes in Szillery's classroom at United Technologies Center in Bangor, where she teaches a continuing education class.

THE WEEKLY PHOTO BY ARDEANA HAMLIN Teacher Eva Szillery folds a paper unit, part of a modular origami structure she teaches students to create in her class at United Technologies Center in Bangor.
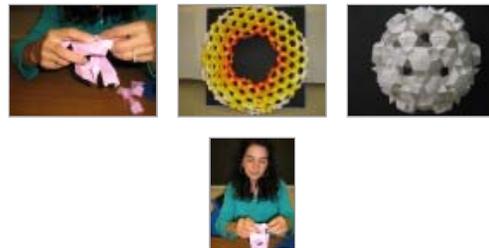

"I got to origami from mathematics," Szillery said. "I realized that it is extremely useful in teaching math. Many have a problem learning math because it is an abstract concept. Using modular origami, the student walks away with a product in his hands."

The modular origami pieces Szillery and her students create dazzle the eye with color, symmetry and creativity.

A sphere dubbed the Epcot Ball took 270 square pieces of paper to fashion. Other creations can contain hundreds of paper squares and as many as seven colors. Each piece is constructed from

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individual units with edges inserted into folds to build the piece module by module.

"Everyone who learns it has fun with it," Szillery said. "Students can take home what they fold."

Szillery uses "teaching boards" to help students learn the process needed to fold each piece of paper in a particular, precise way to achieve each structure, beginning with a fold as basic as a pleat and progressing step-by-step all the way to the finished object.

In the modular origami class, Szillery said, reasoning is more important than coming up with a right answer. Students learn about perpendicularity, parallelism, similarity, size, congruence, symmetry and visualizing.

They experiment and learn by interacting with others. The process engages the brain, hands and eyes, she said. Students learn to see how hexagons, pentagons and octagons interrelate to control the curvature of a shape.

Artist Mary Ann Ingalls of Bangor said she decided to take Szillery's modular origami class, offered through the University of Maine continuing education program for adults, because "I love paper and I wanted to learn to manipulate it in new ways."

The amazing thing about Szillery, she said, "is that she can see a 3D object in her mind and then create that object."

Taking the class allows her to explore the medium fully, Ingalls said.
"I'm very satisfied with the creations I've made in the class," she said. She said she is interested in making her own paper with which to do modular origami.

Szillery's students range in age from young children just learning to recognize shapes such as squares, triangles, hexagons and pentagons to quilters interested in exploring more deeply the geometric aspects of quilting.

From an early age Szillery "liked math better than anything else" and credited her teachers in her native Hungary for nurturing her desire to learn mathematics.

The art of folding things has applications in the real world, Szillery said. For example, scientists devise ways to fold instruments to be sent into space. Medical science uses folding techniques in order to insert devices into the body during surgery. The automobile industry uses folding to pack air bags into cars. Parachutes are another example of an applied use of folding.

"One of the reasons I advocate for the inclusion of modular origami in the classroom is because it's inexpensive," Szillery said, and does not require sophisticated equipment. She said recycled paper from magazines and newspapers can be used in modular origami.

"Teachers who are frustrated with getting students to participate in class, who want to challenge and engage students, can use modular origami to link mathematics to aesthetics," Szillery said.

Examples of Szillery's modular origami shapes will be on display through April 15 at the DEC Center of Bates College in Lewiston. The exhibit is supported by a scholarship from the Harward Center for Community Partnerships of Bates College. The goal of the exhibit is to show the benefits of modular origami for learning mathematics, spatial relationships, fine motor skills and other things.

Szillery is a member of the Maine Junior Engineering Technical Society, state director of the American Mathematics Competitions, and director and founder of the Maine Mathematics Science and Engineering Talent Search Program. She also was the recipient of the University of Maine Pulp and Paper Foundation 200 Outstanding Teacher Award.

To learn more about her classes, call 356-0207, e-mail evaszillery-mmsets@me.acadia.net or visit http://courseweb.stthomas.edu/gps/mmsets.

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