MAIN LINE SCHOOLS

Harriton students participate in a geometric epiphany

By DAVID ROBINSON

George Hart is an effervescent guide and conversationalist on the subject of geometric sculptures. For an afternoon, Harriton's cafeteria was Hart's workshop, where he took a bare handful of students, parents and a lone teacher through the techniques of creating a stunning finished work of art.

Hart is an internationally known geometric sculptor, scholar, mathematician, engineer, writer, computer scientist and educator at the University of New York, Stonybrook. His writing on geometric shapes, along with his original computer programming to imagine and create his art, have led the field of design into a new era. Viewing his Web site, **www.georgehart.com,** will provide an astonishing glimpse into the Buckminster Fuller realm of 21st century geometric sculpture.

Through a yearlong effort, Pam Grossman, outgoing president of the Lower Merion Committee for Special Education, brought Hart to Harriton for a hands-on mathematical and artistic epiphany. Unfortunately, due to inaction by the administration and faculty, few students knew about the event or were accommodated to attend and participate in this once-in-a-lifetime opportunity.

Through the afternoon, 10 to 12 Harriton students joined the creation process and listened to Hart's fascinating banter about geometry, shapes and the art of design. Two students, Thomas Vernier and Nate Selzer, were allowed to come from the Communiqué program at Bala Cynwyd Middle School. Selzer's mother, Mary Morrison, drove the boys to Harriton, where she was an equal participant in the fascinating hands-on activity and Hart's revelatory, rapid-fire divergences into the art, intricacies and useful possibilities of geometric shapes.

Hart began by showing how various colored plastic sticks fit into tiny ball joints – one stick to one joint – making what he called a "popsicle." He joined popsicles into squares and triangles. Using other holes on the joint, which changed the angles of the sticks, he joined triangles to create rhomboids.

As the figures became more complex, he created icosahedrons (with 20 faces). To add even more complexity, Hart showed how he could use shorter sticks to join triangles, one-to-another, to create squashed and flat variations of the icosahedrons. As the sticks came in different colors, this helped in the explanation and visualization of how simpler shapes could become more complex as they were precisely joined to other popsicles.

Making the complex shapes, art teacher Peter Murray brought a round of laughter as he called popsicles, "Legos on steroids." As Murray worked on the shapes, he spoke with Hart about Harriton's three-dimensional printer and Hart explained the extraordinary computer power needed for the highly complex SLS laser which creates three-dimensional objects at the Stonybrook campus.

As the student assemblers made the various geometric shapes, Hart jumped among them, guiding and showing why a correction was necessary. Slowly, they began to see and understand how the parts created the whole. All the while, he spoke of the fun and adventure of creating shapes, and added explanations of two- and three-dimensional objects. He said that a human figure is three dimensional, but a human shadow is two-dimensional, yet – depending on the angle of the sun - the two-dimensional shadow can be longer or shorter. He then engaged them in a complex discussion of how computer algorithms can be used to create four-dimensional objects with mathematical points.

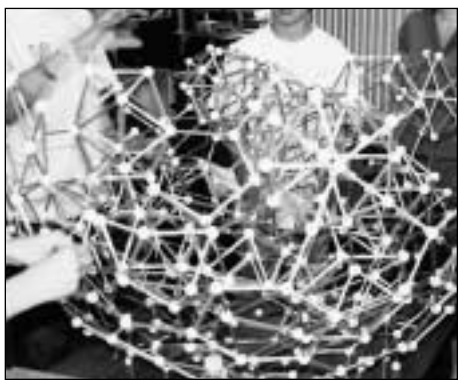
During a short break for snacks, Harriton's Tom Smith spoke with Hart about colleges offering the design sciences, such as Pratt and Cooper Union.

After creating over 50 complex shapes, the students assembled the shapes from the bottom to top, beginning on a table, then moved the figure to the floor for completion. As they began assembling, Hart explained the technique of "mirror" construction, so that when he showed a student what and how to connect figures on one side, students would mirror/duplicate that action around the figure.

Even though this assembly demanded intricate visualization, students working on individual sections began to see larger connections. Hart joked, "I don't think you need me anymore, and I can leave now." With each addition, students became confident in their actions. As one student would point out a necessary connection, others would follow.

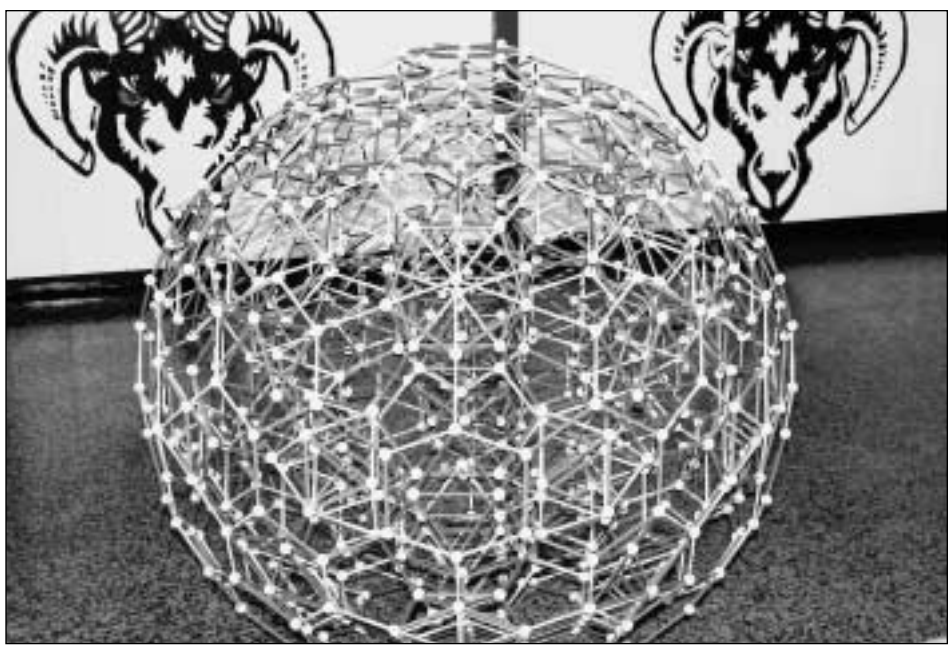
A small sigh was audible as they finished, stepped back from and admired the completed work. In the weeks to come, the sculpture will be on display at Harriton.

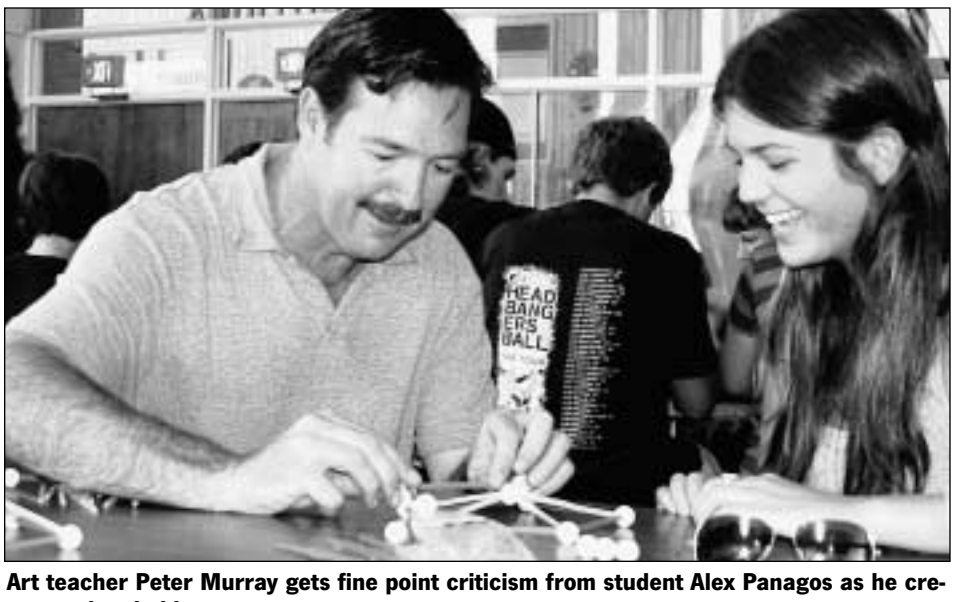
Gathered around their completed masterpiece are the artist/assemblers (in front, from left) Bala Cynwyd Communiqué's Thomas Vernier and Nate Selzer, Harriton's Monika Zaleska, Committee for Special Education President Pam Grossman, Alex Grossman, Kat Leis and Navit Serlin; (back) Selzer's mother, Mary Morrison, Tom Smith, artist George Hart, Grossman's father, Len Singer, and Harriton's Mike Lee.



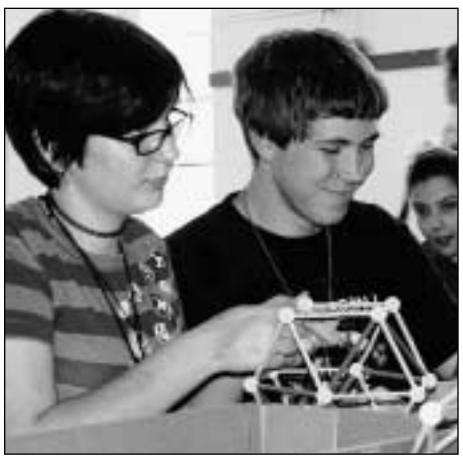
Hart shows the "artist/assemblers" how to make regular, squished and flat icosahedrons.

Outgoing President of the Lower Merion Committee for Special Education Pam Grossman (standing), who arranged for Hart's visit, and the incoming President Lynn McNulty watch as George Hart demonstrates how pieces fit together.





Art teacher Peter Murray gets fine point criticism from student Alex Panagos as he creates a rhomboid.



Kat Leis and Navit Serlin create rhomboids. In the background, Alex Grossman watches the shapes being assembled.

Monika Zaleska and Tom Smith work on the rhomboids.