Going Out On Top

East High Engineering Seniors Claim First Prize in Memphis Zoo Herpetarium Challenge

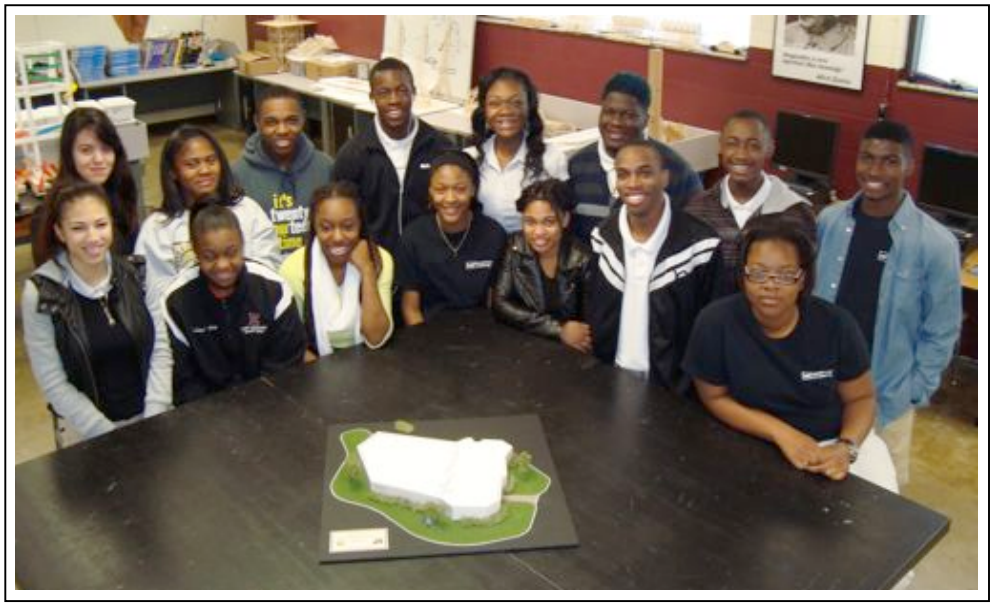
On May 2, 2014 the senior class of the East High Optional Engineering Program added an exclamation point to their high school career by claiming first place honors in the Memphis Zoo Herpetarium Challenge.

Chris Baker (left), Assistant Curator of Reptiles for the Memphis Zoo, discusses details of the herpetarium with East High Engineering students during their field study in February

The competition, sponsored by the Memphis Zoo and the West Tennessee STEM Hub, was open to all schools in west Tennessee. The challenge presents the existing reptile house, or herpetarium, and offers teams the opportunity to revise, expand, or replace the current facility with the team's vision of a new and/or improved herpetarium.

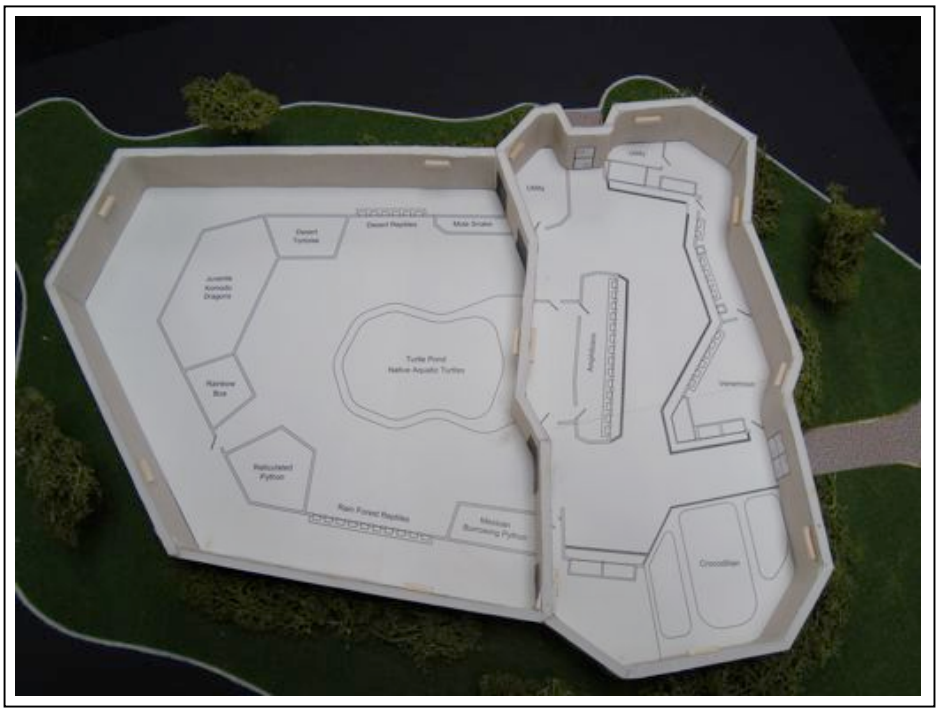
Teams from each school could enter the challenge in one of two competition levels. Schools entering in Tier Two were required to produce a presentation binder containing documentation describing their solution including design drawings for their project. Tier One teams were also responsible for producing the project binder. In addition, each Tier One team built a scale model of their design.

In January, the East High team planned out a 12-week schedule for the project. The schedule included a day-long field study at the herpetarium that gave them the opportunity to take detailed measurements of the existing facility and record locations of incoming electrical, water, and gas supplies. The herpetarium staff took team members behind the scenes to see the staff work areas and specimen storage areas.



The East High Herpetarium Challenge project team with their completed architectural model

The team conducted a specimen inventory comparing the Memphis herpetarium to those in St. Louis, San Antonio, Houston, Nashville, and Cincinnati. This information was used to determine the space needed for future expansion of the Memphis facility. Information collected during the February field study indicated that the existing herpetarium is structurally sound and did not need to be replaced. The East team decided to design an expansion of the existing herpetarium that would accommodate a larger specimen inventory while providing zoo personnel with much needed work and storage space. Their design started with the existing 6,200 ft^2 facility and added a 9,100 ft^2 expansion onto the south side of the building. Even with its new 15,300 ft^2 size, the expanded herpetarium fit within the existing site boundaries.



The East High design retains the original Herpetarium (right) and adds an expansion that would increase the facility from the current 6,200 ft^2 to more than 15,000 ft^2

One of the most important steps in the project was the development of the project Leadership in Energy and Environmental Design (LEED) study. The study was a guiding document as the team developed each phase of the project. By designing an expansion to the existing herpetarium, demolition cost and waste was minimized. The design would also allow for the existing facility to remain open during most of the new construction. The existing building would only be closed during the final stages of construction when wall openings were made to tie the two buildings together.

The LEED study also helped determine the support systems that would be used in the new expansion. LED lighting would be used both in the staff work areas and the public spaces. The use of LED lighting would reduce energy use in half compared to fluorescent lighting. Additionally, each specimen display, known as a vivarium, would be individually controlled for temperature, humidity, and light levels using a computer-based control system. This technology would save energy costs while allowing zoo personnel to customize the environment of each vivarium for specific specimens.

The East High team constructed their architectural model at a scale of 1 inch = 10 feet and mounted it on a 24 x 24 inch base. An enlarged copy of the floor plan was attached to the base and the exterior walls were built around it. The floor plan shows the various display and staff areas and how the floor space of the two buildings is tied together.

During their four years in the Optional Engineering Program, the senior class has accumulated more than 75 awards at local, regional, and state competitions sponsored by the University of Memphis, the University of Tennessee, and the Technology Student Association. The sixteen seniors have received nearly $1.5 million in scholarship offers from colleges and universities across the country, and most plan to continue their studies in engineering, technology, or robotics.

Members of the East High Engineering team at the Herpetarium Challenge award ceremony