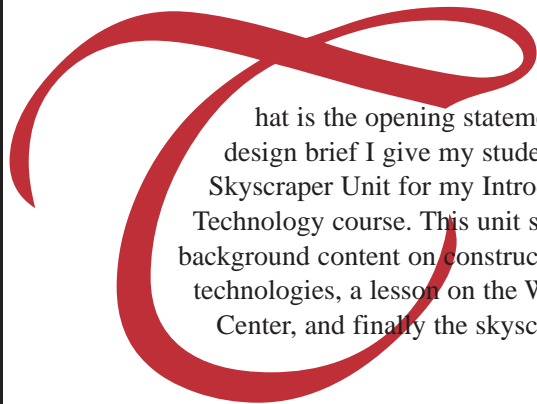


“You have been chosen to design and build a skyscraper in Lower Manhattan, and you must complete a paper model of your design.”

SKYSCRAPER SAVVY

by Ryan Del Guercio



hat is the opening statement in the design brief I give my students in the Skyscraper Unit for my Introduction to Technology course. This unit starts with background content on construction technologies, a lesson on the World Trade Center, and finally the skyscraper project.

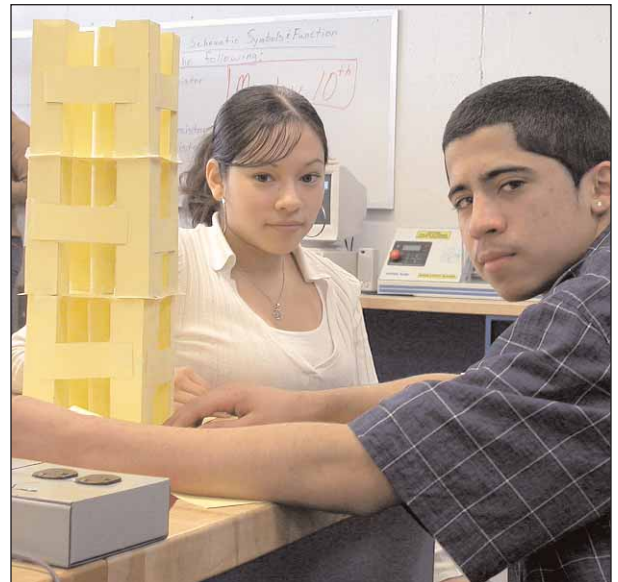
The project is an important aspect of the unit because it gives the students hands-on work along with a real-world problem-solving situation. In doing so, it allows students to be creative and go through the whole design and construction process of a skyscraper similar to what a real engineer would experience.

Construction Technologies

To begin the skyscraper unit I do a lesson on construction technologies to familiarize the students with various construction materials, loads, and forces. The “building big” homepage on the www.pbs.org/wgbh/buildingbig website has some effective interactive activities which provide the students with quality information about skyscrapers. The materials, forces, and loads modules within the website are valuable tools to utilize when teaching this lesson. Now that students are able to identify various materials used in construction and the different forces and loads acting on skyscrapers, they are ready for the next lesson.

World Trade Center Technology

This lesson really grabs the students’ attention and gives the main reasons why the two towers collapsed from a structural engineer’s perspective. The NOVA website www.pbs.org/wgbh/nova/wtc/innovation.html has some very accurate information on the twin towers in the article, “Why the Towers Fell”. The article gives a timely account of the main events that led to the towers falling, using many of the new terms and content the students learned earlier in the unit. Taking information from previous lessons, the students are able to understand what types of



Mr. Del Guercio's students make their final design adjustments to their skyscrapers.



This grouping shows the variation of designs created by the class.



Students try varying the geometric shape of their support beams to discover which design works the best.

materials, forces, and loads were involved in the World Trade Center.

Skyscraper Technology Learning Activity

By this time the students are very eager to start the project, having learned the different construction technologies and all about the World Trade Center collapse. The first thing I do is set the design parameters and grading system which is as follows:

Design Plan	25pts.
Execution of Plan	25pts.
Specification Requirements: (total)	75pts.
2 Feet High	25pts.
Sustain Wind Load	25pts.
Holds 10 pounds	25pts.

Procedure/Criteria

First the students are divided into groups (no more than three to a group). The groups begin brainstorming different skyscraper sketches and then draw a final design (top view and side view) that must include measurements in inches. Then I approve the design and give them the materials to get started. Each group gets only 30 sheets of paper, scissors, and scotch tape. The students cut and fold the paper to make circle, square, or triangle beams to support their skyscraper as shown in their design plans. The model must be at least 2 feet high, hold ten pounds on top, and withstand substantial wind load simulated by a fan.

Testing/Evaluation

Now the students get to show off the product of their creativity and skill and survey the designs of the other groups. When testing the models, I do each test separately, saving the weight test for last in case the model can't hold the weight and collapses.

Conclusion

On a pedagogical level the skyscraper project employs a differentiated learning/teaching method, which benefits students of all learning backgrounds. This project is fun and rewarding for teachers and students, and some very creative skyscrapers come out of it. ●

Ryan Del Guercio has a masters degree in Technology Education from West Virginia University and is currently teaching Introduction to Technology at West High School, West Orange, NJ.