



## Suggested Activities to Complete After Your Visit

### Activities with a Focus on Mathematics

How Much Did It Cost?

Putting Things In Order

A Good Design

Do You Have Sky Scrapers?

New York City As Wearable Art



## New York City As Wearable Art

The purpose of this activity is to help students see how skills they have in one area relate to and depend on skills they have in another area. For this activity they will have to use geometry, visual literacy, drawing/design skills and language arts.

### Activity

Lead students in a discussion about the geometric shapes they discovered in New York City. Help them remember what they discovered and where they found their discoveries. Have different students illustrate, as best they can, the shapes as they were seen on the city streets and buildings, etc.

Have students choose **ONE** of the geometric shapes they found in the City and use it as the basis for a textile design.

Here are some geometric figures they might have found in the city:

- squares
- rectangles
- triangles
- parabola
- parallelograms
- semi-circles
- cones,
- hexagons,
- octagons,
- trapezoids,
- pentagons,
- triangular pyramids,
- rectangular pyramids,
- cylinders
- angles
- symmetry
- congruence
- tessellation



**Tell students that they are creating a design for a textile that could be made into an article of clothing they would wear.** Have students create their designs initially on paper. Since they are using only ONE shape to construct an entire composition, students should focus on ways to make it interesting. The use of repetition, overlapping & utilizing the negative space to manipulate their designs should be considered. Here is some basic information your students will need about these three techniques:

*Negative Space is the space around and between the subject (s) of an image. Negative space may be most evident when the space around a subject, and not the subject itself, forms an interesting or artistically relevant shape.*

*Overlapping means to lie or extend over and partly cover something.*

*Repetition involves the use of patterning to achieve timed movement and a visual “beat.”*

After students have created their initial design on paper, have them create it on fabric.

When the designs are completed, have each student display and explain his/her New York-inspired design. Ask each student to name his/her work.

Invite a fashion designer to your classroom to see your class’s work.

Have students search for words that have the same qualities as the different New York shapes they discovered:

- Words that feel like they are in a circle
- Words that feel like they are in a square
- Words that feel like triangular words

Have students bring in items that are examples of shapes they discovered in New York City.

Have students research these fabric designs:

- Kente Cloth from Ghana*
- Art Deco Designs from the 1930’s*

Have a game break with your students during which they complete tangram puzzles.



### **Materials Needed**

Different art supplies  
Plain fabric like unbleached domestic cut into equal sized pieces  
Fabric paint or markers  
Scissors  
Drafting paper  
Samples of geometric figures  
Straight edge  
Compass  
Access to the Internet or other research tools  
Tangram puzzles

### **Good Website for Information About Textile Design and Geometric Designs:**

1. <http://www.artlandia.com/wonderland/glossary/---> This site gives definitions of fabric designs and design concepts.
2. <http://www.textilemuseum.org/---> This is a link to the Textile Museum in Washington, DC. Each month it features information and illustrations of a different textile.
3. <http://mathforum.org/geometry/rugs/---> This site gives some clear information about the geometry found in carpets.
4. <http://www.mathleague.com/help/geometry/polygons.htm> --- This is a great site that has examples of lots of geometric shapes.
5. <http://artchive.com/artchive/P/picasso.html> --- This site provides a good biography of Picasso and an explanation of Cubism.
6. [http://www.marshall.edu/akanart/cloth\\_kente.html](http://www.marshall.edu/akanart/cloth_kente.html) --- This site has information about and examples of Kente cloth.
7. <http://webexhibits.org/colorart/african-kente.html> --- This site has information about and examples of Kente cloth.
8. <http://www.tangrams.ca/puzzles/puzzles.htm> --- This site has information about tangram puzzles as well as resources for creating tangrams.
9. <http://www.gieson.com/Library/projects/games/matter/> --- This site has tangram puzzles to solve.



## How Much Did It Cost?

When you are not responsible for the actual construction or purchase of an item it's often difficult to have any appreciation for the amount of time that goes into creating it or of the costs associated with it. The purpose of this activity is to help students understand a bit of the economics of the built environment.

### Activity

Have students choose 10 buildings in their community and find out how much each building cost to build --- **per square foot**.

When students have completed their cost calculations have them adjust for inflation and figure out which buildings were the most expensive. Help them speculate what made these building the most expensive.

Have students rank the buildings they researched from the most expensive to the least expensive.

Invite a developer into the classroom to discuss the costs associated with the construction of a building.

### Materials Needed

Access to the Internet or other research tools  
Access to local developers  
Paper and pencils  
Calculators

### Good Websites About Building Construction

1. <http://www.bls.gov/oco/cg/cgs003.htm> --- This is the website for US Department of Labor, Labor Statistics. It has good information about the building construction profession.
2. <http://www.pbs.org/greatprojects/> --- This is a PBS site all about the great building projects that have been done in the United States.



## Putting Things In Order

See Student Worksheet M

This activity is intended to help students understand the different responsibilities of architects, engineers and various tradesmen who design and build skyscrapers. This activity is intended to help students get a beginning understanding of the concept of **critical path planning**, which made the building of the Empire State Building possible. It requires students to use organization, time estimates, mathematical calculations, visual planning and teamwork. Through this activity they will sample some of the responsibility of creating a skyscraper.

### Activity

In this activity student teams will assume the roles of the different tradesmen and workers that were needed to construct the Empire State Building. Their task is to work together to create a plan for building the Empire State Building. We suggest that you act as the project superintendent. You will be responsible for overseeing the entire project.

(No --- you won't actually have to build a building!!)

First you must arrange your student into teams and **assign each team** a job. Here are the jobs we suggest:

1. plumbers
2. heating contractors
3. electrical contractors
4. steel workers
5. marble workers
6. internal finishers
7. masons
8. elevator builders
9. cement suppliers
10. workers in charge of transporting people, supplies and equipment to the work sites
11. the demolition crew --- responsible for demolition of the hotel on the spot before building could begin
12. personnel in charge of hiring all the workers
13. supervisor of services such as food, health care, toilets, etc.
14. safety engineer
15. worker scheduler
16. people raising the funds to pay for the building
17. people responsible for rentals once the building is constructed



18. people working with the city to make sure all laws are met
19. the architects
20. the engineers

Help each student team clearly understand and define what its job entails.

Next give teams the Student Worksheet: *Getting the Job Done*. It contains questions that each team will need to address in order to get their job done correctly.

Allow each team to begin working on their questions as an individual team.

Then assemble the teams to work as part of the larger construction team. The teams will quickly realize that they cannot work independently!! They need to coordinate with the other teams.

All teams will need to do outside research to better understand how to get their part of the construction completed. Some teams may want to consult with local professionals in their specific field. Other teams may want to do on-line research.

As your critical path develops and changes, keep a record of it on a large board or paper so everyone is aware of where the teams are in the process. We suggest reporting on progress achieved on a daily basis until the final plan is completed.

Continue until you have a plan for building the Empire State Building that outlines what happens first right down until the building has its first tenant.

Invite local tradesmen to come into the classroom and inspect your final plan.

Find out what tradesman were involved in building your school.

**Materials Needed:**

Student Worksheet: *Getting the Job Done*

Photographs of the Empire State Building for motivation!

Access to local tradesmen

Access to the Internet or other research tools

A large board or paper for keeping track of the critical path



### Good Websites for Learning About The Construction of Big Buildings

1. <http://www.pbs.org/wgbh/buildingbig/index.html> --- This website was created to explore large structures and what it takes to build them to accompany **BUILDING BIG™**, a five-part PBS television series from WGBH Boston. It's a great site with interactive activities that address bridges, domes, skyscrapers, tunnels and dams.
2. <http://www.greatbuildings.com/cgi-bin/qlk?http://www.nypl.org/research/chss/spe/art/photo/hinex/empire/empire.htm> --- This link takes you to the New York Public Library website. They have some incredible photos of the construction of the Empire State Building
3. <http://commons.bcit.ca/civil/edufacts/> --- This site is all about civil engineering presented through the use of both text and visual images.
4. <http://www.constructmyfuture.com/Students/CoolStuff/index.asp> --- This site is intended to introduce students to the construction profession. This particular page has information about the most significant construction projects in the 20<sup>th</sup> Century.
5. <http://urbangreenpartnership.org/> --- This site presents information about **green building**.



## Do You Have Sky Scrapers?

This activity takes students into their local community to take note of the size and shape of their built environment. They will need to use their knowledge of skyscrapers as well as their skills of observation, visual literacy and their research skills to complete this activity.

### Activity

Use the following definition of a skyscraper to help students discover the skyscrapers in their community:

*Skyscrapers must be over 20 floors in height.*

*Skyscrapers must be taller than they are wide (bigger in height in proportion to their width).*

*They must have usable floors – People must live, work and/or play there.*

Have students explore their community once more, this time looking for skyscrapers. Use the following statistics for the Empire State Building for comparison. Students should make every attempt possible to collect similar data on the skyscrapers in their community:

### **Empire State Building Statistics:**

It is 1,472 feet in height to the top of the antennae.

It is 1,250 feet to the 102<sup>nd</sup>-floor observatory.

It has a **volume** of 37 million cubic feet.

The **area of the site it occupies** is 83,860 square feet.

The **cost of construction** of the Empire State Building was \$40,948,900.

At 102 floors it surpasses the Chrysler Building in height.

Have students photograph the skyscrapers they find. They should also make sure they record the name and address of each to use later in their research.

If students come upon skyscrapers under construction they should make note of the number of professions working on the building.

When students complete their community research, compare everyone's findings together as a class. Locate all the skyscrapers found on a map of your community.



Have students graph all the skyscrapers they discovered based on individual building height.

Compare the height of skyscrapers in your community with others around the world.

### **Materials Needed**

- Map of your community
- Camera
- Paper and pencils
- Access to local public records
- Computer graph program or graph paper
- Statistics about skyscrapers around the world

### **Good Websites with Information About Skyscrapers Around the World**

1. <http://www.emporis.com/en/bu/sk/st/tp/wo/> --- A great site for comparing skyscrapers.
2. [http://www.skyscraper.org/TALLEST\\_TOWERS/tallest.htm](http://www.skyscraper.org/TALLEST_TOWERS/tallest.htm) --- This is a link to the Skyscraper Museum in New York City.
3. <http://skyscraperpage.com/> --- Another good site with all kinds of information about skyscrapers.