BUILDING TALL IN THE UNITED STATES

A. BUILDING ON A GOOD FOUNDATION IS VITAL WHEN CONSTRUCTING A TALL BUILDING – Total building failure from the foundation up in China

B. EARLY COMPETITION WORLD WIDE

- 2600 BCE - Great Pyramid of Giza - 472 ft.
- 12th century - Italian Towers in Bologna - 319 ft. (80 to 100 residential towers)
- 14th century - Lincoln Cathedral in Great Britain - 340 ft.
- 1884 - Washington Monument - 555 ft.

C. UNITED STATES IN THE 19TH CENTURY

1. What made it feasible to build a tall building in the late 19th Century?
   - Development of new structural systems - steel framing vs. load bearing masonry
   - Mass production of steel
   - Development of the safety elevator by Elisha Otis in 1850's
   - Development of the electric motor by Tesla
   - Development of new infrastructure - electric wiring and pumps for water
   - Understanding the need to brace a tall building for wind; Eiffel Tower provided information on wind bracing

2. Early tall buildings in Chicago:
   - 1884-85 - Home Insurance Building (138 ft.) - 10 stories; one of the first load-bearing steel framed building. Architect William Le Baron Jenney
   - 1889 - Rand McNally Building (148 ft.) - first all-steel framed structure; architects Burnham & Root
   - 1891 – Monadnock Building (215 ft.) - 17-story load-bearing masonry building, highest load-bearing building in the United States; architects Burnham & Root. Addition was steel framed to same height and designed by Holabird & Roche
   - 1891 Wainwright Building (147 ft.) - first steel-framed building with soaring vertical bands located in St. Louis; designed by Louis Sullivan

3. Competition between New York and Chicago from 1913 to 2014:
   - 1913 Woolworth Building, New York City (792 ft.) - Cass Gilbert Architect “Cathedral of Commerce”
• 1925 Tribune Tower Competition (492 ft.), Chicago – John Mead Howells & Raymond Hood Architects. Eliel Saarinen’s entry of a modern high rise came in second

• 1930 Chrysler Tower (1,046 ft.), New York City - William Van Alen, architect. Art Deco Tower, tallest brick clad structure in the world

• 1931 Empire State Building (1,250 ft.), New York City - William F. Lamb, architect, tallest building in the U.S. for 31 years

• 1969 John Hancock Building, Chicago (1,127 ft.) - SOM, Inc. Bruce Graham & Engineer Fazlur Khan, external wind bracing as a design feature - tube frame design

• 1971 World Trade Center (1,368 ft.), New York City - Minoru Yamasaki - architect. Twin towers, tube design with a central core, each floor was approximately an acre of area. (208 ft. x 208 ft.)

• 1974 Sear (Willis) Tower (1,451 ft.), Chicago - SOM, Inc. Bundled tube design - Bruce Graham & Fazlur Khan Engineer

• 2014 One World Trade Center (1,776 ft.), New York City - SOM, Inc. David Childs, architect

D. ADDITIONAL TALL BUILDINGS DESIGNED BY U.S. ARCHITECTURAL FIRMS

• Petronas Twin Towers, Kuala Lumpur (1,483 ft.) - Cesar Pelli, architect

• Burj Khalifa, Dubai (2,717 ft.), SOM, Inc

• Kingdom Tower, Jeddah, Saudi Arabia (3,281 ft.) – SOM, Inc. 167 stories; minimum height and number of stories

E. DISCUSSION ABOUT COLUMBUS FIELD TRIP