



Activity Title: Paper Towers

Focus Questions:

- Can you build a paper tower strong enough to support a hardcover textbook at least 12 inches above the table for 30 seconds or more?
- What is the lowest cost design you can build?

Materials: (maximum per person)

- 10 sheets of paper (8.5 inches x 11 inches)
- 10 inches of ½-inch-wide masking tape
- 12-inch ruler
- Scissors
- Hardcover textbook

Set-Up Notes:

No special set-up requirements. A sturdy table and chairs are helpful. If the table moves when bumped, students' tower may fall over. This activity can also be done on the floor.

Facilitation Notes:

Often, engineering projects only allow engineers to use certain amounts or kinds of materials. Also, many materials come in standard sizes from the store, and engineers must adapt their design to make use of these materials.

You can encourage friendly competition or introduce a connection to the real world by having a construction deadline, for example "Complete your design and construction within 15 minutes." Engineers, too, have to meet deadlines.

Introduce more mathematics by having students pretend that each sheet of paper used during the construction costs \$1,000, and each 1/4 inch piece of tape costs \$100. Construction materials are not free; and there is a cost for all materials used or damaged in construction, even the materials thrown in the garbage. Have students add up the cost of everything they use.

Science, Technology, Engineering, and Math (STEM) Questions:

S - How might the thickness of the paper affect the strength of your tower?

T - What would make your tower stronger? What other materials would you want to use and why?

E - Are there shapes that are stronger than others? Can you design, test, and use evidence to prove that some shapes are stronger?

M - If your tower supported a 2 lb. book, how many pieces of paper would you need to support a 5 lb. book? How much would it cost? How about a 10 lb. book? How much would it cost?

Suppose you wanted to use paper to hold up a 1000 lb. billboard. How many pieces of paper would you need and how much would it cost? (Ignore the effect of wind.)

Connections to Everyday Life:

Civil engineering, construction. Engineering projects often allow engineers to use only certain amounts or kinds of materials. Also, many materials come in standard sizes from the store, and engineers must adapt their design to make use of these materials.