**Learning Objectives**

After this activity, students should be able to:

* Identify which designs can and cannot withstand the self-weight of the newspaper tower as well as a lateral wind load.
* Explain how their towers worked to withstand the lateral wind load using terms learned in other lessons within this curricular unit if applicable or general engineering terms.

**Background**

Several solutions to this design challenge are more obvious that others, although students can definitely surprise you with unexpected designs that work quite well.

* Rolling several small tubes to attach to the bottom or a central tube of newspaper is a good design. The cylinder acts to allow the tower to have the wind go around the building. The more narrow and slender the tower is at height the better it is able to withstand the "wind" because less surface exists for the wind to act upon.
* Another solution is a tripod type design. While the majority of the newspaper is used to build up, toward the bottom, three tightly wound newspaper rolls extend down from the tower to the table at an angle. This gives the tower more resistance against toppling in the wind load.
* Another solution involves having a very wide base for the tower to sit on, like a foundation.

**Newspaper Towers**

1. Divide the class into groups of two or three students each.
2. Distribute scissors around the classroom for students to share. Give each group 12 inches (30 cm) of tape and three full sheets of newspaper.
3. Give teams 15 minutes to test different designs.
4. After 15 minutes, students are allowed to return all their materials to the teacher in exchange for another 12 inches (30 cm) of tape and three more sheets of newspaper.
5. Give students an additional 20 minutes of construction time.
6. TESTING: Measure and record the height of the final tower. Then step away from the tower so it is at arm's length and blow out a full breath to simulate a hurricane. A successful tower will not topple over. Make sure the tower is not secured to a table, the floor or any other piece of furniture or wall.
   * Place the tower 18 inches from the fan.
     + Test at all three speeds
   * If the tower has not moved locations on the table or fallen over repeat at 12 inches
   * If the tower is still standing and has not moved repeat all three fan strengths at 9 – 6 inches from the tower.

**Activity Extensions**

* Have students try building newspaper towers for height only or to support an object.
* Have them then compare the differences in design between towers designed to hold vertical vs. lateral loads, and between towers that are not designed to hold any weight but their own.

**Activity Scaling**

* For younger kids, allow more time and materials, and suggest some design ideas.
* For high school students, allow less time and fewer materials, or have them use only one sheet of letter-sized paper but more time.

**Materials:**

* newspaper
* office tape
* scissors
* meter stick