



## TOWER POWER

### Fun Facts:

- Pittsburgh is known as the City of Bridges. Pittsburgh has 446 bridges, more than any other city in the world, including Venice, Italy.
- Pittsburgh's first river-crossing bridge was the Monongahela Bridge, built in 1818 on the site of what is today the Smithfield Street Bridge.
- Pittsburgh has many types of bridges such as: truss, beam, arch, cantilever and suspension, to name a few.
- The Liberty Bridge is an example of a steel cantilever bridge.

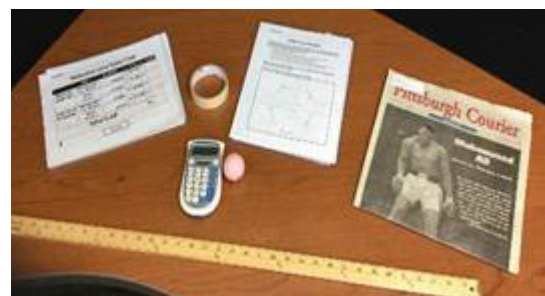
### Your Challenge:

- Your challenge is be an engineer and build a cantilever tower out of only newspaper and tape.
- **Remember:** Engineers are problem solvers who invent, design, analyze, build and test machines, computer systems, structures, gadgets and materials to fulfill functional objects and requirements. All while considering the limitations imposed by practicality, regulation, safety and cost.
- Engineers use this engineering design process:
  1. **PLAN:** draw a diagram and gather your materials.
  2. **CREATE:** follow your plan and test it out.
  3. **IMPROVE:** How can you make it better, did it work, do you need to add more or less?



### Materials:

- 30 sheets of newspaper cut into half-sheets
- Roll of tape (masking tape works best)
- 1 golf ball
- 1-meter stick or tape measure
- 1-2 sheets of plain paper



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## **Your cantilevered tower must be built according to the following limitations:**

- Your tower should have a minimum height of 150 centimeters.
- The only materials you may use are the 30 sheets of newspaper and masking tape. You do not have to use all of the sheets of newspaper.
- Your materials must not be taped to anything for support. It must be a free-standing structure.
- You must build your tower on the floor (as opposed to on a table, desk, etc.)
- Your tower must be able to hold the weight of one golf ball at its highest point.

## **Directions:**

1. Sketch your cantilever tower design on your plain paper.
2. Next, roll, twist and/or bend the newspaper anyway you wish and tape it where necessary to keep it together.
3. Now begin to build a base with the above newspaper piece(s) for your tower.
4. Continue to add to your tower with your rolled, twisted and/or bend pieces of newspaper.
5. Remember you want to build your tower to be 150 centimeters tall.
6. Once you have built you tower 150 centimeters, place your golf ball securely at the highest-point of your tower.
7. Hopefully, your 150 centimeters tower is strong enough to hold the weight of one golf ball at its highest point!