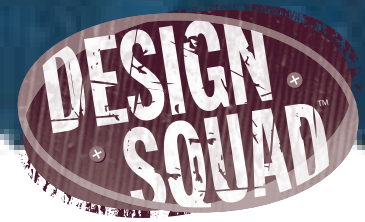


# HIGH RISE



## YOUR CHALLENGE

Build a tower that can support a tennis ball at least 18 inches off the ground while withstanding the wind from a fan.

## MATERIALS\*

- Building surface (tray, cardboard, or piece of wood)
- Electric fan
- Paper (copier paper and/or newspaper)
- Straws
- String
- Tape (masking or duct)
- Tennis ball
- Wooden skewers or Popsicle sticks

\* For information on where to get these materials, see page 6 or visit [pbskidsgo.org/designsquad/engineers](http://pbskidsgo.org/designsquad/engineers).

## BRAINSTORM AND DESIGN

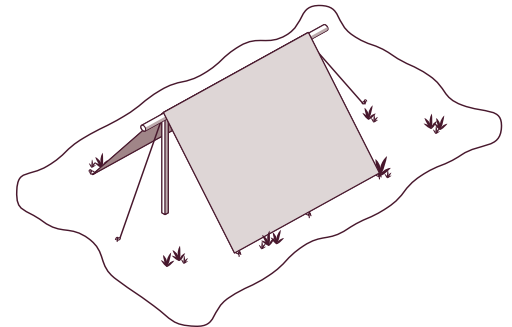
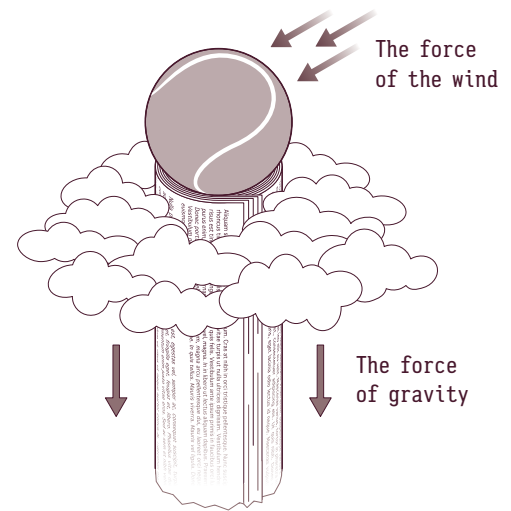
Divide into teams of two or three. Before you begin designing, brainstorm answers to the following questions. Record and sketch your ideas in your design notebook.

- How can we use our materials to make a tower that's at least 18 inches tall?
- How can we use flexible materials, such as paper and string, to make a tower that is strong enough to hold up a tennis ball?
- How can we keep our tower from tipping over?
- How will we design our tower to resist the push of the wind and the pull of gravity?

As you brainstorm designs for your tower, think about other structures and how they stand up. For example, a tent combines flexible and rigid materials to make a frame and covering that can stand on its own.

## BUILD, TEST, AND REDESIGN

Once you've got a tower to test, put it one foot away from the fan. (If your tower is hard to move, bring the fan over to the tower.) See how your tower responds when you turn the fan speed on low. When we made ours, we had to debug some problems. For example, our tower tipped over, our tennis ball kept falling off, and the weight of the tennis ball bent our tower. If any of these things happen to you, figure out a way to fix the problem so that your tower works as expected.



A tent combines flexible and rigid materials to make a structure that can stand on its own.

# HIGH RISE

## TAKE IT TO THE NEXT LEVEL

- Strengthen your tower so it can support a tennis ball when the fan speed is set to high.
- Build a tower that can support a baseball, softball, or soccer ball instead of a tennis ball.
- Make a tower that can support a tennis ball that's 36 inches off the ground.

### INSIDE THE ENGINEERING

#### WIPE OUT

When you're schussing down the slope at 80 miles per hour, who's got time to think about whether your snowboard will hold together? That's where Chris Fidler comes in. He's an engineer at Burton Snowboards®. Chris thinks a lot about snowboards so you don't have to. Snowboarding since he was a kid, Chris now works with designers to build what he thinks makes the best snowboard. To make a board, Chris presses thin layers of fiberglass, metal, and plastic together—sort of like a club sandwich. Each material's thickness and shape (e.g., corrugation, strips, tubes, and mesh) affects the board's strength and flexibility. Chris then subjects his boards to a series of tough tests. Robotic instruments twist, bend, and pound the boards to see how much force they can take before breaking—something you definitely *don't* want to find out when you're catching air on a halfpipe!

Burton Snowboards is a registered trademark of The Burton Corporation

## TAKE IT ONLINE

Want to avoid a mess? Select the best materials for different drink containers! Download *Materials Choice* from Intel's *Design and Discovery* hands-on engineering program.

➤ [intel.com/education/designanddiscovery](http://intel.com/education/designanddiscovery)



Photo: Mika Tomczak

The *Design Squad* cast tapped their "inner artists" as they designed and built wind-powered sculptures from recycled materials. One sculpture—The Aqu-AIR-ium—had a heavy steel base and sheet metal fins so the "bowl" full of fish could rotate in the wind.



Watch *Design Squad* on PBS (check local listings). Download more challenges at [pbskidsgo.org/designsquad](http://pbskidsgo.org/designsquad).



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