

Time:

45-60 minutes

Explore:

structural science (shape of structure affects stability), material properties, engineering design process (define a problem, create, test, and improve)

Materials:

- Gather up a bunch of household items with different structural elements: wide bases, thin bases, surfaces, heavy things, and light things. Here are some suggestions, but feel free to use your own!
- Building materials: cardboard tubes, cereal boxes, plastic bottles, paper plates, card stock, paper/plastic cups, shoe boxes
- Measuring Tape/Ruler
- If you are playing this as a competition, you'll need a set of duplicate materials for each team.

Tower Time

Kid Description: Grab a grown-up and some friends for this building game. Can you stack a tall, stable tower?

This activity is best played on the floor with two to four players. If you have more than four players, break up into teams. If you have kids with motor issues or who otherwise cannot participate, ask them to help take measurements or document.



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Wonder

- ★ Sit in a circle and pass around the materials. Give everyone one material to explore.
- ★ Ask kids to use their senses to explore each material.
 - **Ask:** What are these materials?
 - **Ask:** Let's investigate how strong these materials are. Try tapping them on the floor. Do they feel strong?
 - **Ask:** Which pieces would make a good base? A base is something wide and strong that goes on the bottom to make the whole tower strong.
 - **Ask:** Based on your explorations, which materials do you predict will work best for a tower? Would you put them on the top or bottom of a tower? Why?
- ★ Put the materials back into a box/bag before explaining the rules.



Define a Problem

- ★ Explain the rules of the game (Choose one version):
 - **Competitive:** Each team is going to work together to make a tall, stable tower. You'll have the same sets of materials, and will take turns putting down your pieces. After everyone has placed three pieces, we'll measure and see which team has the tallest tower!
 - **Non-Competitive:** You are going to work together to make the tallest, stable tower you can! Everyone is going to take three turns putting one piece of the tower down at a time. We will take turns adding pieces until we have made a tall tower, and then we'll measure!

Create and Test

- ★ Organize the materials in piles for each team.
- ★ Time to start building!
 - If you have more than 4 kids, split them into teams. You could make it a competition.
- ★ Encourage the kids to take turns and to place just one piece at a time.
- ★ If the tower falls down, and it's just a small fix, ask the kid to reassemble the fallen piece.
- ★ If the tower falls down completely, jump to **Reflect** and then ask the kids to redesign and rebuild their tower.
- ★ If kids need more support:
 - **Hint:** Wider objects make a good base for other materials to go on top.
 - **Hint:** Medium-sized objects can make good supports for the middle of a tower.
 - **Hint:** Smaller, narrow objects are usually better for the top of a tower.
 - **Hint:** Try folding paper to make it sturdier.
- ★ After three turns each, the game is done!
- ★ Use your measuring stick or ruler to measure the towers.

- ★ If you played in teams, compare towers to see which team built the tallest tower.



Reflect

- ★ Have everyone sit or stand together again.
- ★ Ask kids to document the tower that they made by drawing it on the printout. Encourage them to draw what they used for the top, middle, and base of their tower.
 - **Ask:** On the printout, document what your tower looked like. Draw what you used for its top, middle, and base.
 - **Ask:** Did your tower fall down? Why do you think that happened?
 - **Ask:** How would you improve your tower if you built it again? Are there other materials you'd like to try?
- ★ If you play the game again, use your drawings to help you redesign the towers.



