

Apple Tower STEM Challenge Directions

Activity: Apples Aloft (Straws & Tape Variation)

Challenge Goal

Design and build a completely free-standing tower using only straws and tape that can support the weight of a whole apple at the top for at least 10 seconds. The tower cannot be taped to the table or floor!

Materials Checklist (Per Team)

- 20 - 30 Drinking straws (paper or plastic)
- 1 Roll of masking tape (or approx. 3 feet per team)
- 1 Whole, medium-sized apple
- 1 Pair of scissors
- 1 Ruler or tape measure

Step-by-Step Instructions

Step 1: Brainstorm and Design (5 Mins)

Analyze the challenge materials. Look at the apple's weight and the flexible nature of the straws. Spend a few minutes sketching a blueprint on paper. *Tip: Focus on geometric shapes like triangles, as they distribute weight much better than squares.*

Step 2: Build a Strong Base

Create a wide, stable foundation. Use several straws to form a large triangle or a pyramid base. Tape the joints firmly, but use your tape efficiently so you don't run out later.

Step 3: Construct the Vertical Support

Bundle straws together for added strength. Taping 2 or 3 straws together tightly creates thick, strong pillars that resist bending under a heavy load. Connect your vertical pillars with diagonal straws to form X-shapes to stop the tower from leaning.

Step 4: Build the Apple Cradle

Design a small platform, basket, or cup shape out of straws at the very top of your tower to prevent the apple from rolling off. Ensure this platform sits directly over the center of your base to maintain perfect balance.

Step 5: Test, Analyze, and Redesign

Gently place the apple on top to conduct a 'soft test' and see where the straws bend or buckle. Remove the apple and reinforce those weak points with extra support or tape before your final run.

Step 6: The Final Official Test

Place the apple entirely on the top cradle, remove your hands completely, and count to 10. If the tower stays fully upright, your engineering design is a success!