

Week 3: Go Fly a Kite

Warm breezes make summer the perfect time to fly a kite. A tetrahedral kite is made up of triangles connected together to make pyramids. Connect several pyramids together and watch this unique kite soar as you learn about the forces of flight.

Experiment

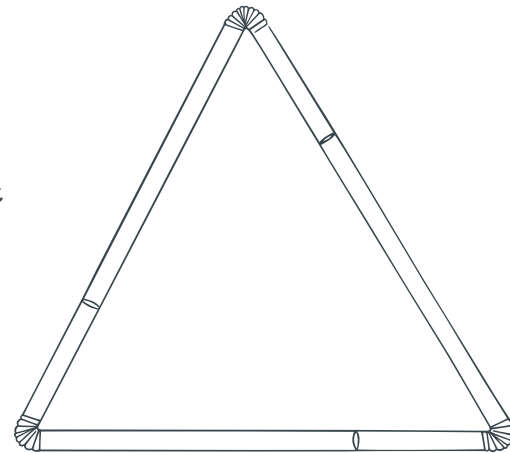
TETRAHEDRAL KITE

Materials

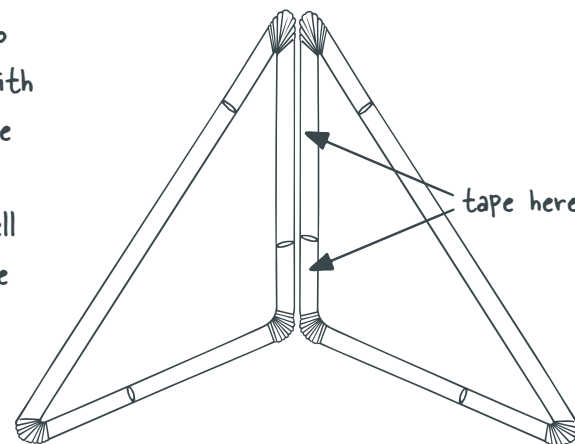
- 24 bendable drinking straws
- Pipe cleaners
- Tissue paper
- Clear tape
- String
- Kite cell template (available at msichicago.org/summerbrain)

Instructions

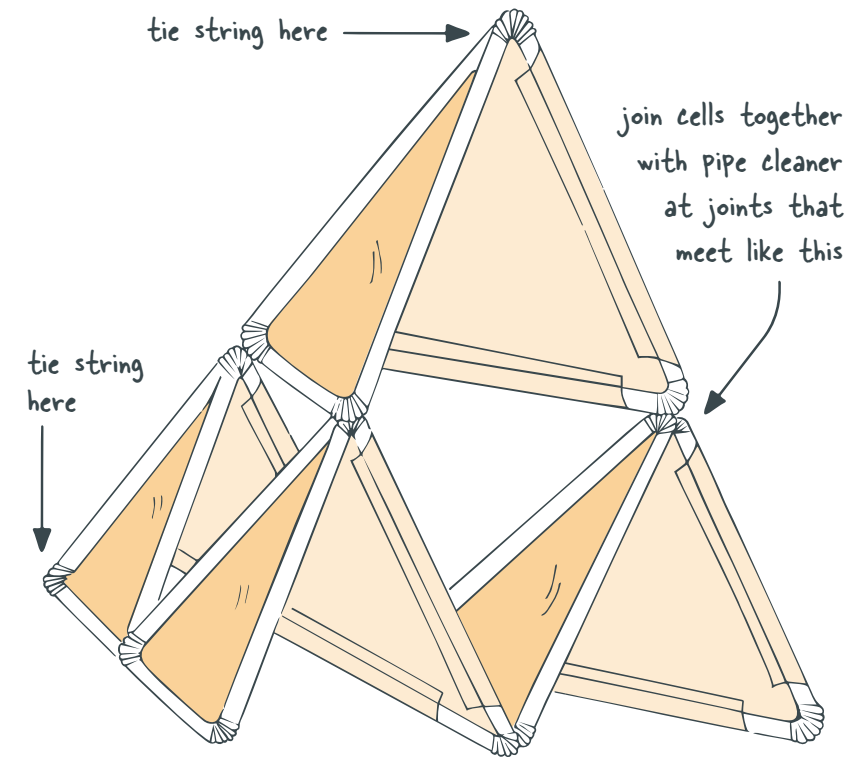
Make a triangle by flattening the long end of a straw and inserting it into the shorter end of another straw. Connect three straws to make a triangle, and repeat until you have eight triangles.



Make a cell by joining two triangles along one edge with tape, so the pyramid shape opens outward. Cover the back two sides of each cell with thin paper, like tissue paper or plastic grocery bags. Use our template for an easy pattern for the cell covering. Repeat to make four cells.



Attach the four cells together with pieces of pipe cleaner at the corners to make a larger pyramid. Place three cells on the bottom in the shape of a triangle, and one on top attached to the tops of the other three cells. Make sure the open sides of each cell are facing the same way.



Turn the kite around and tie the string to the back, attaching it at the top and bottom of the back edge of the pyramid. Leave plenty of string to let your kite soar. Now go for a test flight!

What's happening?

A kite flies when all forces - lift (up), weight (down), thrust (forward) and drag (backward) - are balanced. The lifting force in a tetrahedral kite comes from catching and deflecting air. Air can't pass through the kite, so it gets blown down at an angle through the tetrahedral cells. Because of Newton's third law of motion - for every action there is an equal and opposite reaction - this downward movement of air causes an upward force on the kite, causing it to lift.

Game on!

Try building a bigger tetrahedral kite by connecting four of the four-celled pyramids in a larger pyramid shape, with three on the bottom and one on top. Add extra support by attaching straws across open diamond-shaped areas. Tetrahedral kites with more cells provide more lift for their weight and tend to fly better, especially in light winds. What different shapes can you make, and do they all fly successfully? Some people have flown tetrahedral kites with 100 cells!

Tips

Add additional supports by attaching straws across the open diamond shapes on the front and bottom of your four-celled kite.

Do a web search for ideas on making unique tetrahedral kites (try www.my-best-kite.com/tetrahedron-kite.html)

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