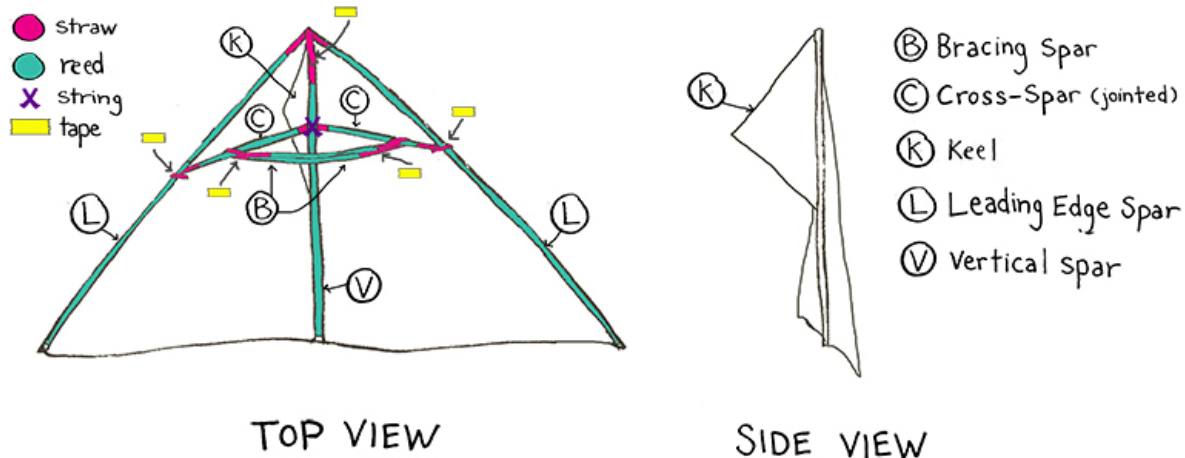
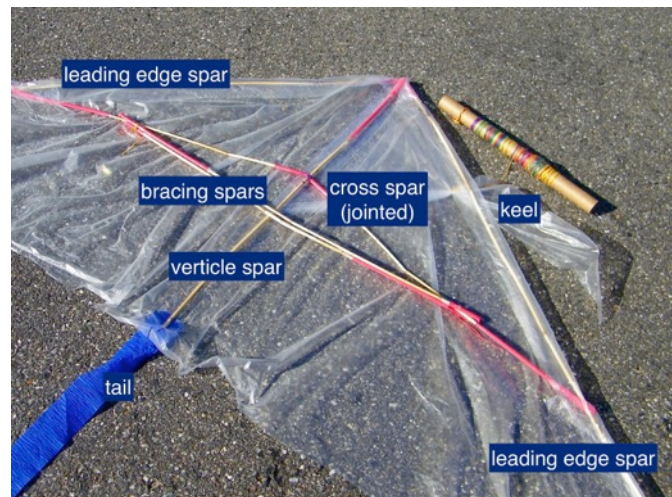


Susan's Delta Kite Building Instructions



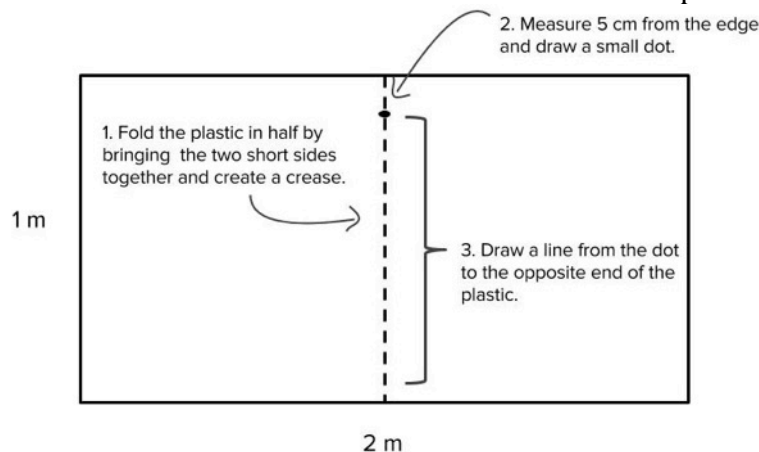
Materials (per kite)

- 6 reeds (4 foot or 1.2 meter lengths)
- 7 flexible straws
- Thin plastic drop cloth
- Packing tape
- ~ 20 meters of thread (string)
- Cardboard tube or stick (to wind string around)
- Black marker
- Meter stick
- Pair of sharp scissors



Part I: Building the Kite Body

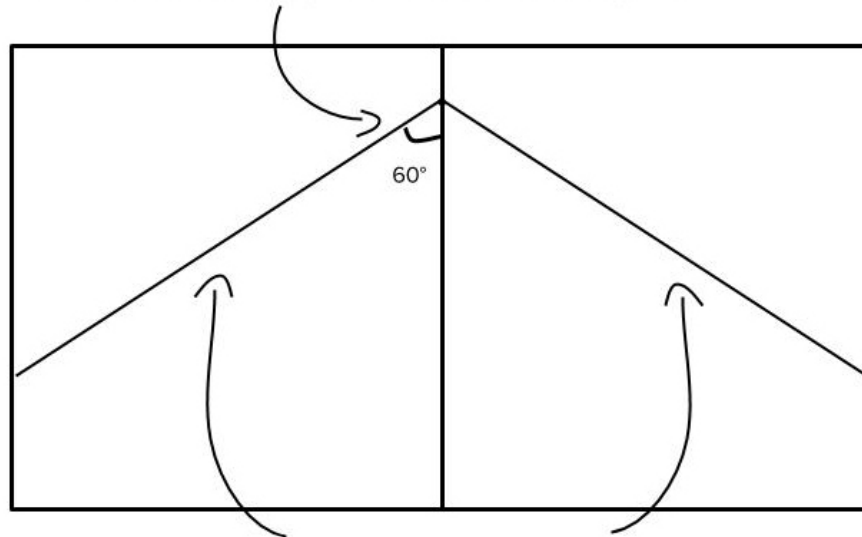
- Step 1** From the reed bundle, select six reeds of similar diameter with no bends or breaks. Cut each reed to be exactly one meter long. These will be your spars, or the "skeleton" of the kite that you will use in the following steps.
- Step 2** Generously cut a 1 m x 2 m rectangle of plastic drop cloth. Use the instructions in the image below to create a dot to indicate where the vertical spar will be placed.



Step 3

Center your protractor origin on the dot you made in the last step. Use the image below to mark the locations of the leading edges of the kite at a 60° angle from the vertical line on both the right and left sides.

1. Center your protractor origin on the dot you made in Step 2. Mark a 60° angle to the left of the vertical line you drew. Repeat this on the right side.



2. Draw a 1.0 m (100 cm) line at 60° extending from the vertical line on each side. These mark the locations of the leading edges of the kite.

Step 4

Stretch a bendy straw so that the flexible rings expand. Bend the straw at its flexible joint and line up the two straight sides, then cut the long end of the straw so that it's the same length as the short end.

Push the thick end of a reed inside both ends of the straw. Use packing tape to secure the straw to the reeds. Center this structure on the lines marking the leading edges of the kite that you made in step 3 so that one reed falls on each 1.0 m line and the middle of the straw rests on the dot.



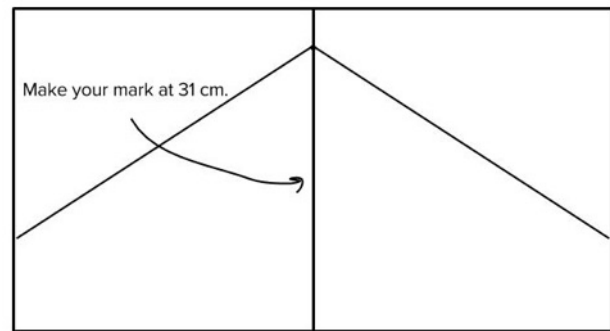
Step 5

Cut off the thin end of another reed so that the reed is 62 cm long, and push it into the long end of a new stretched bendy straw. Secure with tape. Lay the reed down on the center line you drew, with the straw-end towards the dot. Loop the short section of the straw up and over top of the other straw, and secure with tape. This is your vertical spar.



Step 6

Use a pen to mark the vertical spar 31 cm down from where the two spars meet.



Step 7

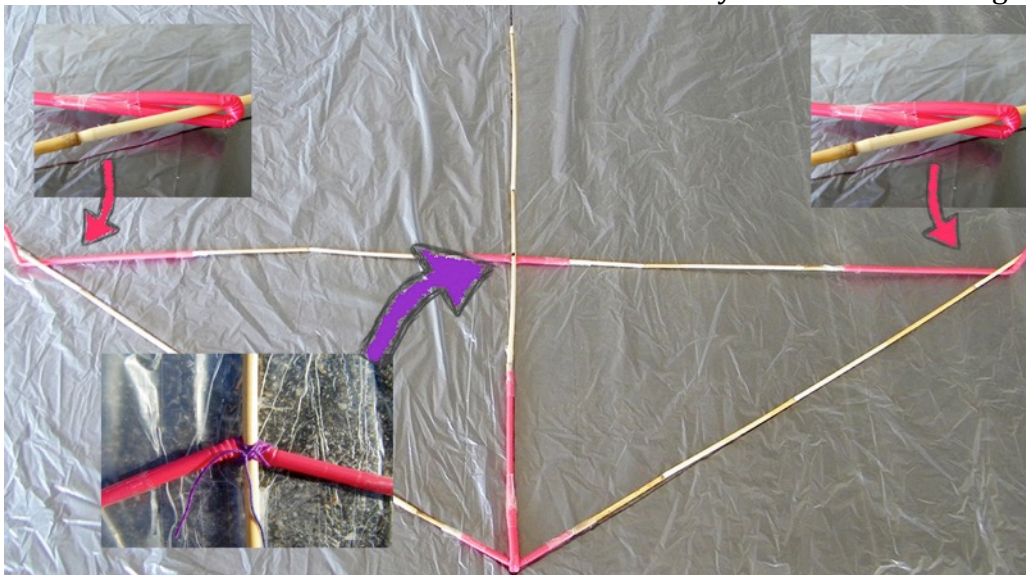
Obtain three stretched straws; you will use them to build a jointed cross spar. Cut a 1 m reed in half. Insert each reed half into the long end of a stretched straw and secure with tape. As in step 4, fold the third stretched straw at the flexible midsection, and then cut off the long end so it's the same length as the short end. Place the unoccupied ends of both reeds inside this straw and secure with tape.



Step 8

Center the section you made in step 7 on the vertical spar so that it rests on the mark you made in step 6. It should be perpendicular to the vertical spar.

- Loop each of the two unoccupied straw ends around the 1m reeds that comprise the leading edges of the kite, and secure with tape.
- Lash the vertical and horizontal intersection you made with string.



Step 9

Re-align the vertical and leading edge spars with the lines you drew on the plastic drop cloth. Tape the vertical spar to the plastic above and below the intersection at the center using a 20 cm length of tape for the top and a 30 cm length for the bottom.



Step 10

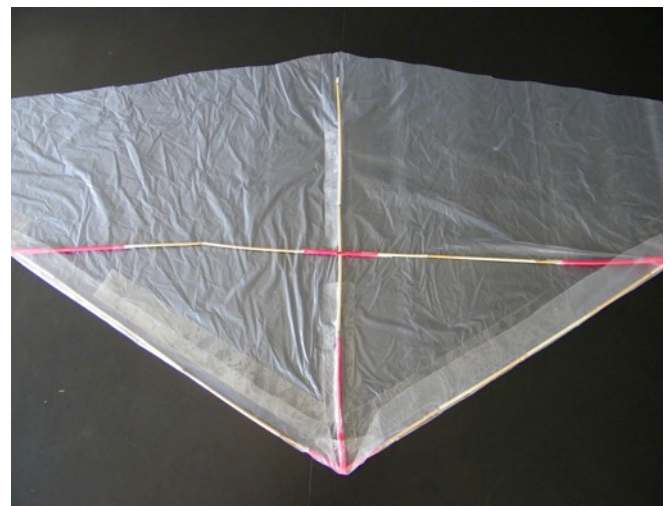
Use a pen to mark a 5 cm-wide border around the entire outline of the spars that you have laid down, making a big triangle.

Starting from the top of the kite, to form a large, slightly protruding triangle (hence the delta name!). When you reach the back/open end of the kite you might want to use either a meter stick or a spare reed as a straight edge to form the bottom of the triangle. Use sharp scissors to cut the plastic along the border. NOTE: Save at least one of the leftover triangular scrap pieces to make your keel.



Step 11

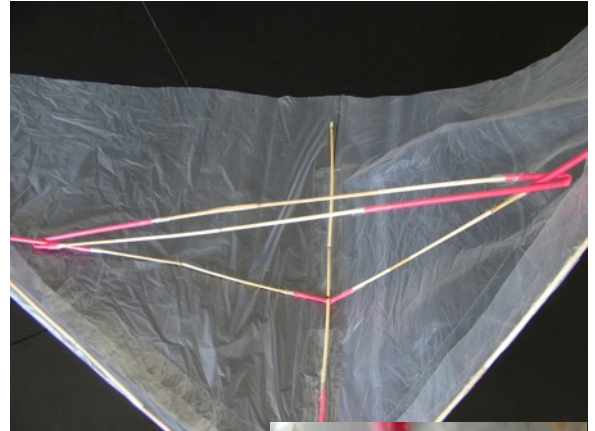
Re-align the vertical and leading edge spars with the lines you drew on the plastic. Fold the excess plastic over the leading edge spars and tape the plastic over the frame using four 40 cm lengths of tape (two for each side). Don't tape over any of the intersections where two spars overlap.



Step 12

Cut two 62 cm reeds that will be used as bracing spars. Insert each reed into the long end of an uncut stretched straw and secure with tape. Bend the short end of one of those straws under the middle of one cross spar, and insert the free end of the other reed and tape it. Repeat on the other side so that the vertical spar is sandwiched between them.

These bracing spars should form a bridge from the middle of one cross spar to the middle of the other. They form a sliding truss structure with the cross spars and can adjust to and withstand the wind's compressional force.



Step 13

Slide and center the bracing spars along the cross spars until you have a right triangle such that the bracing spars form the hypotenuse (see image from step 12 for guidance).

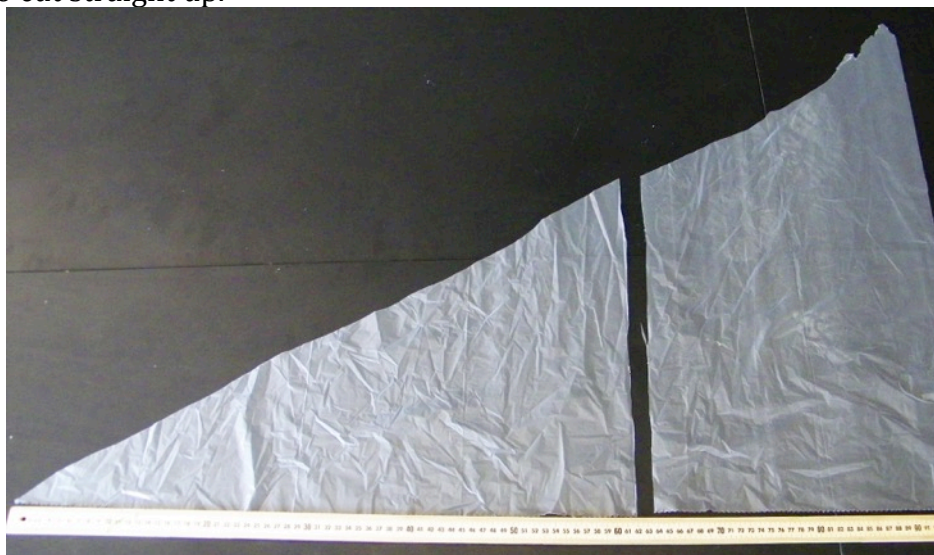
To keep the bracing spars in place, lash them together with string (~30 cm). Slide the bracing spars down to flatten the kite, and flip the kite over.



Step 14

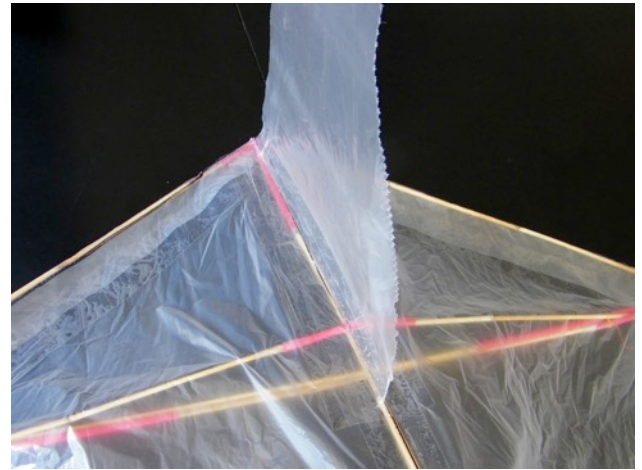
To make a keel, which acts like a rudder for your kite, you are going to trim the saved plastic triangle from step 10 into a smaller right triangle.

Lay the saved plastic so that the hypotenuse is diagonal and the short side is vertical. Measure 62 cm from the smallest angle along the bottom long side, mark it, and use scissors to cut straight up.



Step 15 To attach the keel: be sure you are looking at the bottom of the kite (spars are down on the floor). Lay the keel down on the backside of the kite. Its hypotenuse should be parallel to the leading edge spar and its shortest side should align with the vertical spar.

Tape the short side of the keel on either side of the vertical spar with 40 cm strips of tape. (The tape will prevent the plastic from tearing when it's flying).



Step 16 From scrap plastic (or crepe paper) cut a tail approximately 2.5 m long and roughly 7 cm wide. Use tape to affix the tail to the bottom of the vertical spar, making sure that you tape over top of other tape (so the tail doesn't rip the plastic).



Step 17 Measure out approximately 20 meters of thread (string), knot one end around a cardboard tube (or stick), and wind the remaining string. Make a knot that has a loop at one end and run the string through its own loop.

Step 18 Measure 16 cm down from the top of the kite (this is actually the aerodynamic center), twist the keel plastic until you're pinching it over top of the 16 cm mark and tighten the thread loop around the plastic.



Have a great time flying your kite!